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MASSIVE MELENA

SURVEY OF 129 CASES SEEN AT CHARITY HOSPITAL FROM MARCH, 1950, TO DECEMBER, 1952

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Hematemesis with or without the passage of blood by rectum sufficiently localizes the site of bleeding somewhere between the mouth and the ligament of Trietz. Melena, on the other hand, gives little indication of the site of the bleeding in many instances. If the site of the bleeding can be located the problem of treatment is not usually particularly difficult. This study is therefore concerned chiefly with the problem of diagnosis and localization of the lesions.

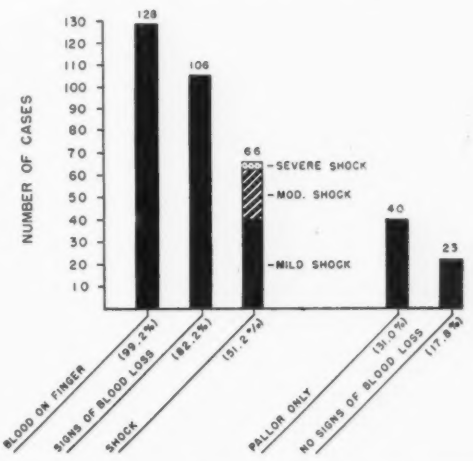
MATERIAL

Over a 33 month period, from March 25, 1950, to December 31, 1952, 4,377 patients were admitted to the surgical services of the Charity Hospital at New Orleans for acute abdominal complaints. Of these, 380 cases (8.7 per cent) were emergency admissions for sudden hemorrhage from the gastrointestinal tract. Of the latter group, 251 patients (66 per cent) had hematemesis with or without melena. One hundred and twenty-nine (34 per cent) had melena alone. These 129 cases form the basis of this report. During this period, 13 cases of intussusception were admitted to the hospital with melena as the chief complaint, but since they also had other symptoms suggestive of intestinal obstruction, or of other acute abdominal lesions, and since they constitute a special problem in themselves, they are not included in this study.

All of these patients were admitted as emergencies. Those with blood-streaked stools and all "piddling" bleeders were excluded. All of them had experienced gross melena within one day of admission, and all except one had blood on the examining finger. No patient was included who had vomited blood or who had coffee-ground gastric contents on aspiration. Chart I

CHART NO. 1

ESTIMATIONS OF BLOOD LOSS



gives evidence of the severity of the blood loss. You will note that 106 patients (82.2 per cent) showed constitutional signs of blood loss, and that 66 (51.2 per cent)

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showed evidence of shock, mild to severe. Only 11 per cent required no blood replacement; approximately one-third of all cases required 2,000 to 3,000 ccs. of blood, and in one instance 13,000 ccs. were required.

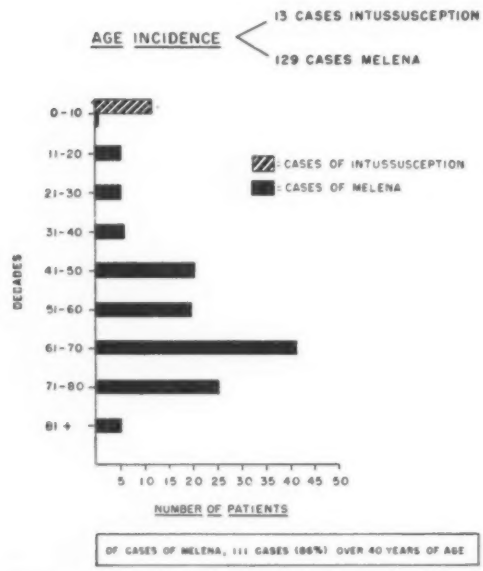
Fourteen patients of the total number died; an over-all mortality rate of 10.8 per cent. Eleven of the deaths (78.6 per cent) were in patients over 60 years of age.

There was a slight preponderance of males in this series, there being 76 cases or 58.9 per cent.

There was no significant difference in racial incidence.

The age incidence is much more significant. You will note that, if we disregard intussusception, gross melena was relatively uncommon before the age of 40 (Chart II). Eighty-six per cent of the cases were

CHART NO. II



over 40 years of age, and 55 per cent were over 60. It should be remembered that the period after 40 is also the period of the high incidence of degenerative diseases and the intercurrent diseases present in such patients add materially to the danger of the bleeding lesion.

SITE OF LESION

We regret to say that the incidence of correct diagnosis in our series is not a significant improvement over that reported by Harvey Stone[1] nine years ago (Chart III).

In almost one-third of these patients no diagnosis was ever made. In two-fifths of

CHART NO. III

COMPARISON OF HARVEY STONE'S SERIES (1944) AND PRESENT SERIES (1953)

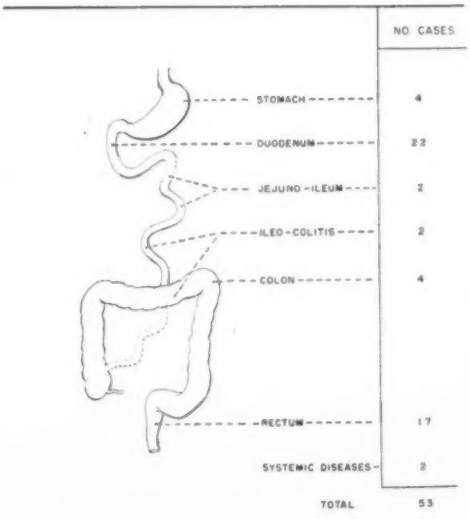
	STONE'S SERIES	PRESENT SERIES
SITES OF BLEEDING FOUND	21 CASES (28.4 %)	53 CASES (41.1 %)
EQUIVOCAL SITES	22 CASES (29.7 %)	34 CASES (26.3 %)
SITES NOT FOUND	31 CASES (41.9 %)	42 CASES (32.6 %)
TOTAL	74 CASES	129 CASES

them, the site was found definitely, and in an additional one-quarter a probable site or sites were found but were never proven beyond doubt. Forty-five of these patients were explored, and in 9 instances even at exploration the site of the bleeding was not determined. In 1 instance, even autopsy failed to disclose the cause and the location of the bleeding.

It is noteworthy that a majority of the lesions, the location of which was definitely demonstrated, were in the most accessible portions of the gastrointestinal tract Chart IV), that is, the gastroduodenal

CHART NO. IV

SITES OF BLEEDING FOUND IN 129 CONSECUTIVE CASES OF MELENA



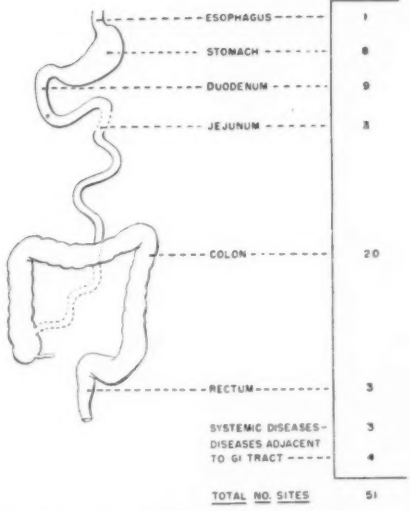
segment and the rectum. In 43 of the 53 patients in whom the site of the lesion was definitely demonstrated, it was found to be in one or the other of these sites. In only 8 instances was a lesion located definitely between the duodenum and the rectum. The difficulty of course lies in the fact that so far as symptoms are concerned, the jejuno-ileum and the right half of the colon are relatively silent, and that the jejuno-ileum is very difficult to visualize satisfactorily by x-rays.

There is a significant difference between the locations of the equivocal sites of bleeding and of those that are definitely proven (Chart V). In the first place, it is noteworthy that in this group of 34 patients, the total number of sites of bleeding believed to be found was 51. Only 18 of these were in the esophagus, stomach, and duodenum, as compared to 20 in the colon. This difference is accounted for by the difficulty of establishing a positive source of bleeding in the mid-portion of the gastrointestinal tract.

CHART NO. V

EQUIVOCAL SITES OF BLEEDING
ENCOUNTERED IN 129 CASES OF MELENA

TOTAL NUMBER OF PATIENTS IN THIS GROUP = 34
TOTAL NUMBER OF EQUIVOCAL SITES FOUND = 51



DIAGNOSIS

Charts VI and VII show the specific lesions responsible for the hemorrhage in all cases in which the cause was believed to be found. Several points are worthy of comment: In the first place, it should be noted that the lesions were benign in 85 of the 101 cases (84.2 per cent). It should be remembered that while bleeding is common in malignant lesions it is quite infrequently massive. Second, duodenal ulcer is the most common of all lesions causing melena in this series. Third, the most common cause of bleeding from the colon in this series was diverticulosis, which was proven or believed to be the cause in 21 cases, second

CHART NO. VI

SITES OF BLEEDING FOUND*
IN 129 CONSECUTIVE CASES OF MELENA

	TOTAL		TOTAL
I STOMACH A CARCINOMA – 4	4	V COLON A CARCINOMA – 2 B DIVERTICULOSIS – 2	4
		VI RECTUM A CARCINOMA – 5 B PROCTITIS – 4 C POLYPS – 2 D HEMORRHOIDS – 2 E POSTOP HEMORRHOIDECTOMY – 2 F. POST – BIOPSY BLEEDING – 1 G CARCINOMA PROSTATE WITH RECTAL INVASION – 1	17
II DUODENUM A ULCER – 22	22		
III ILEUM A MECKEL'S DIVERTICULUM – 1 B MESENTERIC THROMBOSIS – 1	2		
IV ILEO – COLITIS A TUBERCULOUS – 1 B NONSPECIFIC – 1	2	VII SYSTEMIC DISEASES A UREMIA – 1 B LEUKEMIA – 1	2

*53 PATIENTS IN THIS GROUP

CHART NO VII

EQUIVOCAL SITES OF BLEEDING ENCOUNTERED
IN 129 CONSECUTIVE CASES OF MELENA

TOTAL NUMBER OF PATIENTS IN THIS GROUP = 34
TOTAL NUMBER OF EQUIVOCAL SITES FOUND = 51

	TOTAL		TOTAL
I ESOPHAGUS A VARICES – 1	1	V COLON A. DIVERTICULOSIS – 19 B. COLITIS – 1	20
II STOMACH A ULCER – 2 B PROLAPSE OF MUCOSA – 2 C GASTRITIS – 1 D CARCINOMA – 1 E DIVERTICULUM – 1 F HIATAL HERNIA – 1	8	VI RECTUM A HEMORRHOIDS – 1 B PROCTITIS – 1 C FECAL IMPACTION – 1	3
		VII DISEASES ADJACENT TO GI TRACT A CARCINOMA PANCREAS – 1 B. CHRONIC PANCREATITIS – 1 C CARCINOMA PROSTATE WITH RECTAL INVASION – 1 D GALLSTONES – 1	4
III DUODENUM A ULCER – 5 B DIVERTICULUM C DUODENITIS	9		
IV JEJUNUM A MARGINAL ULCER – 2 B DIVERTICULOSIS – 1	3	VIII SYSTEMIC DISEASES A UREMIA – 2 B. PSEUDOHEMOPHILIA – 1	3

14 PATIENTS HAD TWO OR MORE SITES OF BLEEDING

only to duodenal ulcer. It is true that in 19 of these cases the fact that diverticulosis was the cause of bleeding was never positively established; however, we are confident in our own minds that our diagnosis was correct. Fourth, we would like to call attention to the fact that there were 3 cases of uremia and 2 of blood dyscrasias in this group and that while the number is small they are difficult to prove and must always be kept in mind in the course of a diagnostic study.

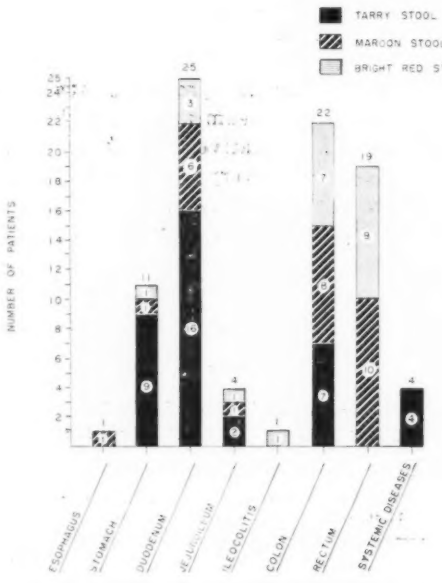
We are deeply concerned about the fact that in a third of all our cases we were unable at any time to establish a source of bleeding and have therefore made an earnest effort to see where our deficiencies lay. We have tried to evaluate the various methods by which a diagnosis can be arrived at, and to see by what means we can improve our accuracy.

A previous history of melena, especially if it occurred one or more years previous to the present episode makes it probable that the lesion is benign. A history of previous gastrointestinal surgery frequently gives an important clue to diagnosis, especially if the previous surgery entailed closure of a perforated peptic ulcer or a gastrojejunal anastomosis. However, in 45 (34.8) per cent of our cases, there had been no previous episodes, and the diagnosis had to be established on the basis of this particular occasion alone.

We have all believed that the color of the stool was an important clue to the level of the lesion in the gastrointestinal tract, and our figures show that this is true. However, there are some notable exceptions, as will be seen in Chart VIII. You will note that in the 22 cases of bleeding from the duodenum, 2 showed bright blood and 5 showed maroon colored blood in the stools. Fifteen showed tarry stools, as one would expect. It is noteworthy also that in the cases of bleeding from the rectum, one-half of the total showed maroon colored blood. It is evident that whereas the color of stool is a valuable evidence of the location of the lesion, it cannot be accepted as positive proof.

CHART NO VIII

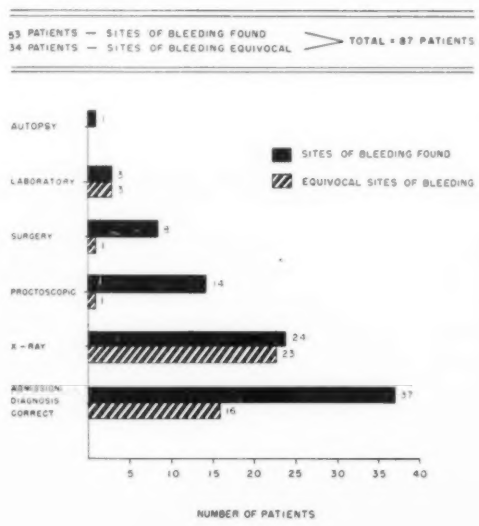
COLOR OF STOOL AND LEVEL OF LESION IN 87 CASES OF MELENA (PROVEN AND EQUIVOCAL SITES)



In Chart IX we have attempted to evaluate the various methods which have been used in this group of cases. In the 87 patients in whom a probable diagnosis was established we consider that the most signi-

CHART NO IX

RELATIVE VALUES OF METHODS OF DIAGNOSIS



ficant observation is the fact that in 53 of the 87 cases (60.9 per cent) the admission diagnosis was ultimately proven to be correct. It is evident that a good history and physical examination constitute the most valuable information that one can have in establishing a diagnosis of the cause of melena. In considering the value of other methods of diagnosis, it must be remembered that there is an overlap here, in that many of the cases in which the admission diagnosis was correct were finally proven by other means and will therefore appear credited to x-ray, proctoscopic examination, or other methods.

Next in importance to the history and physical examination in this series comes the x-ray, since by this means the diagnosis and location of the lesion were established in 47 cases. These were largely in the gastroduodenal segment.

Proctoscopic examination is of course invaluable. You will note that the diagnosis was established by this means in 15 cases in spite of the fact that there were only 21 cases in which the lesion was located in the segment accessible to the proctoscope.

Surgical exploration proved to be a very unsatisfactory means of establishing the diagnosis in our hands. Forty-five patients were operated upon, and in 32 the diagnosis was established by this method. However, in most instances, it was already known before operation. Seventeen cases in which the diagnosis was not known were explored, and in only 8 of these was the diagnosis established by the operation, whereas in the remaining 9 it was never found.

You will see that the clinical laboratory gave us very little help as it established the diagnosis in only 6 cases, most of which were constitutional diseases. Only 2 cases were autopsied, and in one of these the diagnosis was not established.

Out of our experience we have evolved a method of procedure which we think might be of interest to the reader. When a patient presents himself to us with a story of bleeding from the rectum, we employ the following routine:

1. Our first procedure is to estimate the amount of constitutional effect of hemorrhage. That is, check the blood pressure and other evidences of shock. If shock is found to be present, proper measures, including blood transfusion, are instituted to correct it.

2. We make a digital examination of the rectum to determine whether or not blood is actually present there.

3. If the cause of hemorrhage is not obvious after the preliminary examination, a Levin tube is inserted into the stomach to determine whether or not blood can be found in the upper gastrointestinal tract.

4. A history is taken and a limited physical examination is made. You will remember that in our experience this has resulted in a correct diagnosis more often than any other method that we have used. Physical examination is limited to a superficial examination of the heart and lungs, blood pressure, and to palpation and auscultation of the abdomen.

5. Routine laboratory studies. These should include: (a) A complete blood picture. Evidences of leukemia or of thrombocytopenic purpura should be especially looked for. A total red blood cell count and a hematocrit will indicate, roughly at least, the amount of blood loss. (b) A rush blood chemistry should be made, including especially a non-protein nitrogen, or a blood urea nitrogen determination for evidence of uremia. It should be remembered that in the presence of large quantities of blood in the gastrointestinal tract, these tests are likely to show high values. However, they are not usually high enough to confuse the diagnosis with that of a true uremic state.

6. Next, if the evidence points to bleeding from the upper gastrointestinal tract, such as a history of peptic ulcer for example, one must consider the possibililty of x-ray studies of the gastroduodenal segment, even during the bleeding period. This is a controversial matter, and we have until recently avoided such examinations during this period, but have come to believe that they have a real value. They cannot be considered absolutely conclusive, be-

cause of the fact that the gastrointestinal tract containing blood clots may not give clear pictures.

7. If the evidence points to anything below the gastroduodenal segment, sigmoidoscopic examination should be done. It must be remembered that the rectum is likely to contain large quantities of feces, including blood, and that suction and other means of cleaning the rectum in order to permit satisfactory examination must be available.

8. If none of the above examinations have demonstrated the location of the bleeding beyond doubt, a barium enema should be resorted to. You will have noted from our experience that massive bleeding from the rectum is not frequently seen in carcinoma, and that the lesion is more likely to be of some other type. As a matter of fact, in our experience it has been most frequently diverticulosis and diverticulitis. If evidence of acute diverticulitis is present, it may be wise to defer the examination by barium enema, but if there is no evidence of acute local peritonitis and the examination is made by an experienced and cautious observer, this examination is safe and may yield valuable evidence.

9. If the cause of bleeding has still not been demonstrated, a complete gastrointestinal study by x-ray may be undertaken. It must be remembered of course that in the presence of massive hemorrhage this cannot be done, and I am speaking only of those cases in which the situation is well in hand.

10. Finally, if the diagnosis cannot be established by any other means, one may be forced to resort to surgery. But I would call your attention to the fact that in our experience, and this is not dissimilar to that of other observers, this is a very unreliable method for determining the location of gastrointestinal bleeding.

CONCLUSIONS

1. By far the most important diagnostic tool at our command is an adequate history and physical examination.

2. X-ray is much the best method of locating lesions that cause melena, especially in the gastroduodenal segment. We believe also that the use of x-ray during the period of active hemorrhage from lesions apparently in the upper gastrointestinal segment is justified and its use should be increased. X-ray is almost equally valuable in the colon above the rectosigmoid junction, and the chief reason that we do not have as many positive diagnoses by this means as we do in the upper segment is because in many instances the lesion could not be proven to be the cause of the bleeding. Also, most lesions that are readily demonstrable by x-ray in the colon do not usually produce gross hemorrhage.

3. Proctoscopic examination, or rather sigmoidoscopic examination, is practically infallible in lesions of the rectum and rectosigmoid junction, whereas x-ray is of little value in this segment.

4. Surgical exploration is a very poor means of establishing the location and the type of lesions causing melena, and should be resorted to very infrequently.

5. The clinical laboratory, while it established the diagnosis in only a few instances, is an essential part of the diagnostic material because of the fact that it can establish the existence of constitutional diseases in which the site of the bleeding may be impossible to identify.

6. It is probable that a high percentage of the cases in which no cause of bleeding was ever proven were in the small bowel, below the duodenal-jejunal junction. It is highly desirable, therefore, that means of x-ray study of the small bowel be improved. The technique of introducing a long tube into the small bowel and by means of repeated aspiration and serial x-ray studies trying to locate the site of bleeding in the small bowel is one that deserves widespread investigation.

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ELECTROCARDIOGRAPHIC CHANGES WITH SPONTANEOUS MEDIASTINAL EMPHYSEMA

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Mediastinal emphysema was first accurately described by Laennec[1] in 1819. Since then there have been many excellent reviews in the literature[2-8] describing the pathogenesis, signs, symptoms, and differential diagnosis.

With the more frequent use of all of the laboratory tests, more cases have been reported showing electrocardiographic changes. Fagin and Schwab[3] in their review of 39 cases, report electrocardiograms in 19 cases. Of these, 11 were normal, 2 showed low right axis deviation, 2 low voltage in leads one ond two, and 2 showed left axis deviation. Aisner and Franco[2] report that approximately 25 per cent of the cases show positive electrocardiographic findings but no characteristic pattern is present. T wave changes, deviation of ST shifts, changes in voltage, and axis deviation are the most common. Occasionally an altered rhythm is found. Simulation of a coronary attack must be considered and watched. The following is a case report that so closely resembled a coronary occlusion both clinically and by the electrocardiogram that it is reported:

CASE REPORT

A fifty-two year old white male had had a previous history of doudenal ulcer, chronic bronchitis and sinusitis, and recurrent cystitis. At noon on February 24, 1951, he was found unconscious in his office. He had started to vomit and suddenly collapsed and was taken to the hospital. Examination revealed auricular fibrillation, unobtainable blood pressure, cold clammy sweat, and marked dyspnea.

Electrocardiogram was taken immediately after that and revealed a downward shift in lead 1, upward shift in leads 2 and 3 and downward in lead 4. (Fig. 1-A). He was given oxygen, stimulants, and general supportive measures. His pulse gradually became perceptible. By five o'clock he regained consciousness, the blood pressure reached normal level, and dyspnea and vomiting had stopped. A recheck electrocardiogram (Fig. 1-B) showed marked changes from the one taken five hours previously. Emphysematous blebs appeared on the soft palate about this time and there was beginning of subcutaneous emphysema on the neck and upper border of the chest wall. Oxygen and sedation were continued throughout the night. The

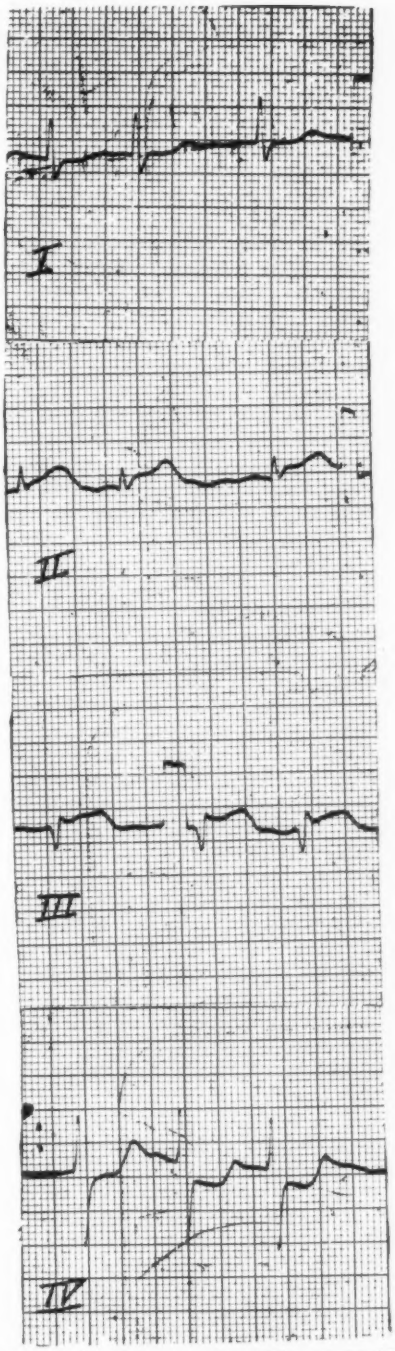

Figure 1-A.—February 24, 1951, 12:00 Noon

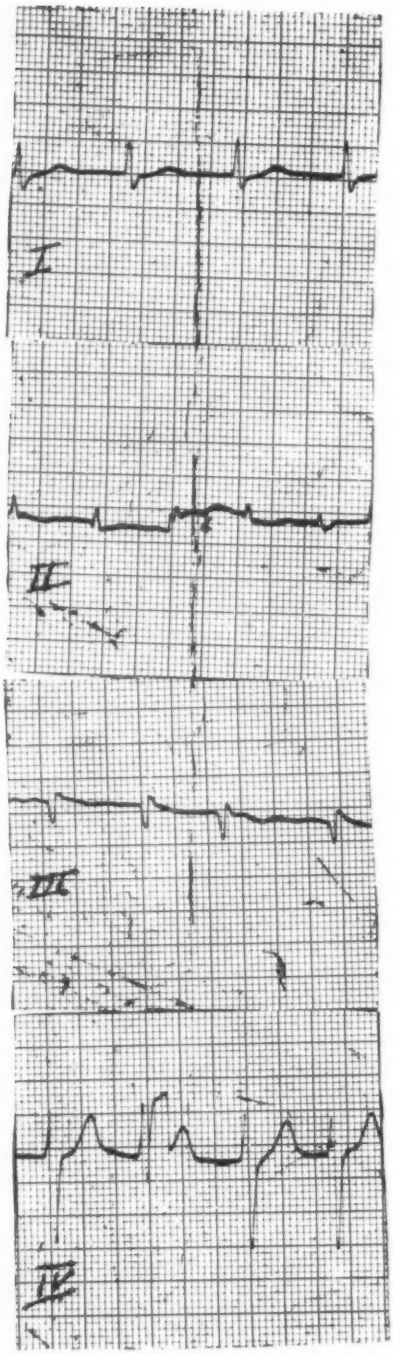

Figure 1-B.—February 24, 1951, 5:00 P. M.

following morning the heart rate was regular, the patient was comfortable and out of shock. There was marked fullness and crepitation in the neck. The blebs in the soft palate were larger. The electrocardiogram (Fig. 1-C) now was identical to the one which we had taken one year previously. He was able to talk, but had marked flushing of the face. The lungs were clear. There was no abdomi-

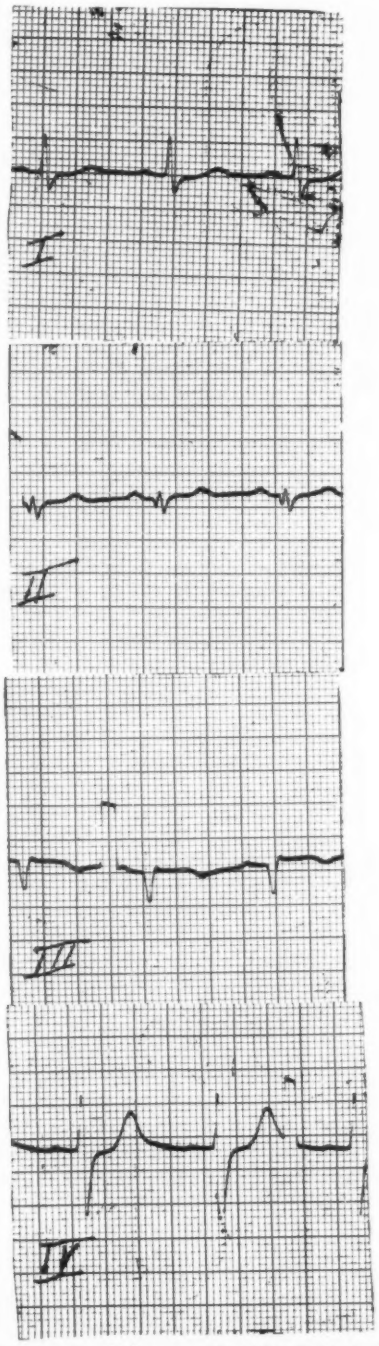

Figure 1-C.—February 25, 1951, 7:00 A. M.

nal distention. The diagnosis of spontaneous mediastinal emphysema was made. This was confirmed by roentgenogram of the chest. The emphysema became progressively worse. In three days it became so severe that a tracheotomy was required to relieve tracheal obstruction. When the skin incision was made, the patient deflated like a balloon. After that he improved rapidly. The tracheotomy tube was removed in several days and he was allowed to go home in two weeks. He lost 18 pounds of weight. Repeated rechecks have shown that the x-ray of the chest is now normal except for some slight thickening in the right hilar region. Blood pressure is 130/90. Electrocardiogram is similar to the one taken on February 25, 1951.

DISCUSSION

This case illustrates the difficulty in differentiating the clinical picture of early spontaneous mediastinal emphysema from acute coronary occlusion. Careful clinical observation and a suspicion of mediastinal emphysema will aid in making the proper differentiation.

SUMMARY

A case of spontaneous mediastinal emphysema with the findings of transitory injury and ischemia shifts on the electrocardiogram and with auricular fibrillation is presented.

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HEART DISEASE IN CHRONIC ARSENIC POISONING

CLINICAL REPORT OF TWO CASES

R. L. ROBBINS, M. D.

ALEXANDRIA

INTRODUCTION

In the practice of medicine, the physician often sees manifestations of disease that have never been previously documented as to cause. It is because of these unusual cases, if reported and documented, that new disease entities are from time to time made known to the profession. It is unusual, however, for medical science to have well documented evidence of an etiological agent, but at the same time no adequate clinical description of the illness so produced.

While there are several references in American medical literature to the ability of arsenic to cause heart disease, myocardial depression, and specific pathology of the heart muscle and its linings, these references do not describe the resulting clinical picture so produced.[1-4] The following cases are reported in an attempt to depict the clinical manifestations of chronic arsenic poisoning with particular reference to the diseased heart, and by so doing, to describe a unique group of symptom manifestations not, to my knowledge, hitherto described.

CASE HISTORIES

Case No. 1. A 50 year old colored male cotton farmer was first seen in the hospital in December 1946. He gave the history of having dusted cotton repeatedly, from 1923 through 1939, with a compound that contained arsenic. During those years he had recurrent but mild episodes of vertigo, weakness, nausea and vomiting. In 1946, he again was exposed to arsenic, but this time only briefly, and could not have inhaled any of the dust. He developed nausea, vomiting, diarrhea, anorexia, and generalized abdominal cramps. These symptoms were followed several days later by sore throat, hoarseness, swelling of the face and neck, and paroxysmal nocturnal dyspnea. His feet had become swollen and his abdomen distended. He was afebrile.

When admitted to the hospital he was found to have edema of the soft palate and of the pharynx, and there was swelling about the face and neck. His blood pressure was 115/70. A mild catarrhal conjunctivitis was present. There were no unusual exudates or membranes in the mouth or throat, and there were no abnormal physical findings on examination of the heart and lungs. The liver was slightly enlarged.

Laboratory findings included a moderately severe macrocytic anemia. A BSP excretion test showed excretion of 75 per cent of the dye in two hours. A Fishberg concentration test showed that the specific gravity of the urine was fixed at 1.010. There was no albuminuria or hematuria. Blood urea nitrogen levels, serum protein levels, and serologic tests for syphilis were all normal. An x-ray film of the chest revealed pulmonary congestion but was otherwise normal. The initial electrocardiogram

showed a prolonged QT interval and a diphasic T2 and inverted T3. A subsequent tracing taken five days later showed a normal QT interval. Venous pressure in the right anticubital vein was 200 mm. of water. Cultures taken from the nose and throat were sterile for diphtheria bacilli. The patient was treated with digitalis, penicillin, and, empirically, diphtheria antitoxin, and slowly improved.

From 1947 through 1952, the patient was hospitalized nineteen times. He never fully recovered from the episode in December 1946. Since that time he had developed progressively worsening paresthesias, and a generalized pigmented, maculate rash. There was thickening of the skin of feet and excessive callous formation of the palms and soles. He was seen by several dermatologists and the diagnosis of chronic arsenical dermatitis was pronounced. There was no response to multivitamin therapy or BAL. In 1949, four years after the last known exposure to arsenic, a twenty-four hour urine specimen was found to contain no arsenic. Specimens of hair and nails were not examined at that time. The cardiac symptoms persisted, and by 1949, had progresed to such degree that the patient was classified as a functional class IV cardiac. Serial chest x-rays showed recurrent pulmonary congestion but no cardiomegaly. Serial electrocardiograms repeatedly showed nonspecific evidence of myocardial disease usually manifest by abnormal T waves. There was no clear cut response to digitalis, although it was used continuously.

In March 1952, the patient was once again hospitalized because of his congestive failure and painful feet. There was a moderately severe macrocytic anemia present. The urinalyses again showed low specific gravities, varying from 1.005 to 1.012, and occasional albuminuria. Physical examination of the heart and lungs revealed no new findings. His blood pressure varied from 110/70 to 135/90. Sternal marrow studies were considered normal on several occasions.

Case No. 2. This 40 year old colored male laborer was employed by an oil field equipment company in 1948. His job required that he clean drilling bits and other equipment used in oil rigs. He would take a white powder, the composition of which was unknown to him, and mix it with water, after which he would place this solution in a closed container, light a fire under it and expose the tools to be cleaned to the steam which was produced. A compound of hydrochloric acid and arsenic had previously been placed on the equipment to be cleaned. The patient used neither protective clothing nor a mask during this procedure.

In September 1948, having been thus employed for about eight months, he noted the onset of nausea, vomiting, anorexia, giddiness, and excessive salivation. Two months later he developed an erythematous eruption about the hands and feet, associated with paresthesia in these areas. The rash slowly spread until it involved his entire body. He developed bilateral conjunctival erythema and excessive lacrimation.

He was first seen in the hospital in May 1949. At that time he was found to have a generalized scaling pigmented maculopapular rash most marked over the hands and feet, with marked thickening of the palms and soles. There was chronic granular conjunctivitis bilaterally. He had albuminuria. A Kolmer blood test for syphilis was positive. There were no abnormal cardiac findings. The remaining findings were not remarkable. He was diagnosed as having had dermatitis venenata, treated with benadryl, penicillin, and boric acid compresses, and discharged. He denied previous antiluetic treatment of any type.

He was seen again in September 1950. His symptoms as described above had all persisted. In addition, the burning pains in his feet had gotten progressively worse until he could no longer stand or walk. He again experienced nausea, vomiting, and abdominal distress. His gums had become swollen and painful, and his teeth loosened. His appetite was good and his diet was considered adequate. He had begun to drink excessively "because of the pain." He had no cardiac symptoms.

On that admission to the hospital it was found that the rash and the conjunctivitis, were still present. There was a glove and stocking type of distribution of the paresthesia. His blood pressure ranged around 135/70. There was slight cardiac enlargement on admission, but no murmurs, and the liver was enlarged 2 cm below the costal margin, but was not tender. Hyperkeratosis of the palms and soles was rather striking. The tendon reflexes were generally hypoactive. The Kolmer test was again positive. Liver function studies showed a four plus cephalin flocculation test; however, the total serum bilirubin and prothrombin time were normal. A spinal fluid survey was normal. The electrocardiogram showed low T waves in leads 1, 2, V5, and V6. A complete peripheral blood study revealed a moderately severe macrocytic anemia, leukopenia, and thrombocytopenia. The bone marrow showed depression of all formed elements, but was not megaloblastic. The gastric juice contained free acid. A biopsy of the skin from the right calf was interpreted as being compatible with arsenical dermatitis. Specimens of the patient's hair and nails were found to contain 33.9 parts per million of arsenic, and a twenty-four hour urine specimen contained 0.006 parts per million of arsenic*. Treatment consisted of bed rest, penicillin, and BAL given intramuscularly, twice daily for fifteen days. There was slight but notable improvement in the paresthesia and the cardiac size diminished as recorded by x-ray. He was dis-

*Tests performed by the Toxicological Section, Louisiana State Department of Health.

charged with the diagnosis of chronic arsenical intoxication.

In October 1951, he was again hospitalized because of return of all symptoms. During the previous months he had returned to his old job with the tool company. The skin rash, conjunctivitis, hyporeflexia, and hyperkeratosis were again noted, and the blood Kolmer was still positive. A blood Kahn test for syphilis was, however, negative. The blood pressure, urinalysis, and peripheral hemogram were normal. The heart was not enlarged, and no murmurs were heard. He received BAL daily for twenty-seven days, together with a high caloric diet and multiple vitamin supplements. His clinical response was not gratifying and he was discharged.

He was again hospitalized in March 1952. At that time he had ascites, pedal edema, abdominal cramps, diarrhea, and a chronic cough productive of thin white sputum. He had developed exertional dyspnea and palpitations, but no chest pain. The important findings on that admission were as follows: Blood pressure 110/60. The generalized skin rash, hyperkeratosis, conjunctivitis, gingivitis and loose teeth were still present. There were crepitant rales at both lung bases. The heart was again slightly enlarged, and an unequivocal pericardial friction rub was present which persisted for several days. There were no cardiac murmurs. The liver was enlarged 4 cm. below the costal margin and was tender. There were ascites, edema of the lower extremities up to the level of the knees, and the tendon reflexes were absent. There again was depression of all formed elements in the peripheral blood. Abuminuria was constantly present and there was a fixed low specific gravity of the urine. The blood urea nitrogen level was 14.6 mgm. per cent. The Kolmer test was positive and the Kahn was negative. Studies of liver function revealed abnormal retention of bromsulfalein; however, the cephalin flocculation test, thymol turbidity, and total serum bilirubin, were normal. The electrocardiograms at no time were diagnostic of pericarditis, or of myocardial infarction; however, there were persistently low T waves in leads 1, 2, 3, V4, V5, and V6. Extensive studies for tuberculosis were all negative.

The patient was treated with digitalis, low sodium diet, and mercurial diuretics, and responded fairly well. He was discharged from the hospital and followed in the outpatient clinic. Six months after discharge he had developed no signs of pericardial effusion; however, signs and symptoms of chronic congestive failure persisted.

DISCUSSION

The classical findings of chronic arsenic poisoning were well demonstrated in both of these patients. Focal edema, paresthesia, nausea, vomiting, diarrhea, abdominal cramps, excessive salivation, hyperkeratosis, and abnormal pigmentations were all present at one time or another. In addition, a generalized skin eruption was present which appeared identical in both men. The exposure to arsenic was established in the past histories of both patients, and arsenic was recovered in the urine, hair, and nails of the patient whose exposure to the poison was most recent.

The etiology of the heart disease that was present in each of these men was never adequately explained despite extensive and repeated examinations. Neither patient was ever found to be hypertensive, nor was there any hypertensive retinopathy. There was no evidence of valvular pathology demonstrable, nor was there any cardiac mechanismal disturbance. Both of these patients showed evidence of congestive rather than anginal failure as the primary manifestation of their heart disease. Although in one patient, the serologic tests for syphilis suggested lues, the absence of clinical and radiographic evidence of valvular and aortitic pathology precluded the diagnosis of luetic heart disease. Both patients received massive and repeated courses of multivitamin therapy with no improvement of their cardiac status. Neither patient at any time could be shown to have tuberculosis despite extensive laboratory studies. One patient was given antidiphtheria antitoxin on his initial admission to the hospital because of the edema of the pharynx and soft palate, but there was no membrane present, and cultures were sterile for diphtheria bacilli. It is interesting to note that the pharyngeal edema which caused the house staff to suspect diphtheria, was actually the most classical symptom of early chronic arsenical intoxication that this patient exhibited.

Since chronic congestive failure due to arsenic poisoning has never been described, it is not justifiable to attribute dogmatically the presence of this condition in the above cases to such cause, even though it has been previously shown that such poisoning can produce pathological changes in the heart, compatible with those symptoms herewith reported. The occurrence in both patients of congestive failure, hyperkeratotic dermatitis, peripheral neuritis, and macrocytic

anemia, suggests the presence of an unusual and bizarre symptom complex associated with exposure to arsenic.

SUMMARY

Two patients with chronic arsenic poisoning were found to have heart disease, the etiology of which was obscure. The possibility of the existence of chronic heart disease due to arsenic poisoning is suggested and the clinical characteristics described.

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DIAGNOSIS OF TUBERCULOSIS BY ISOLATION OF *M. TUBERCULOSIS* IN THE YOLK SAC OF THE CHICK EMBRYO*†

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The bacteriological diagnosis of tuberculosis may be established within four to six days by the chick embryo method. McNelly and Riddell[1] concluded that the culture of *M. tuberculosis* in embryonated eggs is possible as a routine procedure on the basis of results obtained from the inoculation of 125 concentrated sputum specimens on the chorioallantoic membrane and into the yolk sac. Dubos, *et al*,[2] Eggerth, *et al*,[3] and Lee[4] have demonstrated that pure cultures of *M. tuberculosis* proliferate with great rapidity in the embryo yolk sac.

The present investigations developed from previous experience with the rapid growth of pathogenic fungi in the yolk sac of the chick embryo.[5] A chance observation that acid fast bacilli could be demonstrated in smears from the yolk sac four days after inoculation with a biopsy specimen initiated further inquiry into the adaptability of the method for the laboratory diagnosis of tuberculosis. The preliminary studies which explored the potentialities of the method have been reported recently.[6]

A comparative study was undertaken to determine the sensitivity and reliability of the chick embryo yolk sac for the rapid isolation of *M. tuberculosis*. The well recognized susceptibility of the guinea pig to infection with *M. tuberculosis* served as a standard of comparison. The specimens to be tested were collected by staff members from patients on the various clinical services of Charity Hospital of Louisiana at New Orleans. Specimens in which acid fast bacilli could be readily demonstrated by direct microscopic examination were not used in the study. This report will be concerned with a careful comparison of results obtained by injecting guinea pigs and the yolk sac of embryonated eggs with 168 specimens of various types for the isolation and identification of *M. tuberculosis*. Petrik's media was also inoculated with each of the specimens. This method of isolation was found to be less sensitive than the guinea pig inoculation and therefore was not used as a standard for comparison.

METHODS

PRELIMINARY TREATMENT OF SPECIMENS

Spinal fluid: Four to 6 cc. are required for each test. Aseptically collected specimens require no preliminary treatment. Divided into 3 equal portions, one portion is distributed equally by injection into the yolk sac of 6 embryos, another injected into a guinea pig and the remaining one is divided equally over the surface of the slant of each of 2 tubes of Petrik's media.

Pleural, Pericardial, Peritoneal, Joint Effusions or Exudates: Specimens more than 10 cc. in volume are centrifuged at 3000 r.p.m. for thirty to sixty minutes. The sediment is resuspended in 5 to 6 cc. normal sterile saline containing 10 units penicillin and 6 micrograms chloromycetin per cc. The yolk sac of 6 embryos, a guinea pig and 2 Petrik's media slants each are inoculated with one of three equal parts of the inoculum. Volumes smaller than 10 cc. are

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inoculated directly without concentration by centrifugation.

Gastric Washings, Sputum: Equal parts of 4 per cent sodium hydroxide are added to each specimen, thoroughly mixed, and then incubated at 37° C. until all mucus and visible particles are dissolved. After centrifugation at 3000 r.p.m. for thirty to sixty minutes the supernatant is discarded. The sediment is brought to *p*H 7 with 6 per cent hydrochloric acid, using litmus or nitrazine paper as indicator and resuspended to 5 or 6 cc. in normal saline containing 10 units penicillin and 6 micrograms of chloromycetin per cc. One of each 3 equal parts of this suspension serves for inoculation of embryo yolk sac, a guinea pig and 2 slants of Petrik's media.

Tissues: Biopsy specimens, tissues obtained at autopsy or bone marrow aspirates are ground in a sterile mortar with sterile alundum. Sufficient sterile normal saline containing 10 units penicillin and 6 micrograms chloromycetin to provide a manageable suspension is added and then lightly centrifuged to separate the alundum and coarse particles. Embryo yolk sacs, a guinea pig, and 2 slants of Petrik's media are inoculated with an equal portion of the supernatant.

Pus: Uncontaminated specimens are injected without preliminary treatment. If contaminating bacteria are demonstrable in Gram stained smears penicillin and chloromycetin in appropriate amounts are added.

Urine: Urine samples are centrifuged at 3000 r.p.m. for one hour. The sediment is resuspended in 6 cc. sterile normal saline containing 10 units penicillin and 6 micrograms chloromycetin per cc.

Stools: Stool samples are treated by digestion in 4 per cent sodium hydroxide and centrifuged at 3000 r.p.m. for thirty to sixty minutes. The sediment is resuspended in 6 cc. normal saline containing 10 units penicillin and 6 micrograms chloromycetin per cc then brought to *p*H 7 with 6 per cent hydrochloric acid.

INOCULATION OF GUINEA PIGS

Young healthy animals averaging 300 grams in weight proven to be negative to old tuberculin are used. Injections are made intramuscularly into the thigh. The animals are examined weekly for palpable lymph nodes. When enlarged nodes are evident the animals are again tested with old tuberculin. Positive reactors are autopsied and examined for gross evidence of tuberculous infections. Smears are made of the lesions to demonstrate the presence of typical acid fast bacilli. Animals showing no observable evidences of infection are kept for two months at which time they are tested with old tuberculin. Negative as well as positive reactors are carefully examined at autopsy for evidences of tuberculous infection.

INOCULATION OF THE YOLK SAC OF EMBRYONATED EGGS

Fertile eggs incubated in the regular hatching incubator for six to eight days are most suitable. Infertile eggs and those containing dead embryos are discarded by candling. The position of the yolk sac of living embryos is located by candling. A small hole 0.5 cm. in diameter is drilled in the egg shell at this point by means of a dental drill. The exposed shell membrane and immediately adjacent shell are covered with hot melted paraffin. Six embryos are used for each specimen tested.

The yolk sac is injected by means of a tuberculin syringe and gauge 20 or 22 needle. Amounts varying from 0.1 to 0.5 cc. are used, depending upon the volume of the inoculum available. The opening in the egg shell is sealed with melted paraffin.

EXAMINATION OF YOLK SACS FOR ACID FAST BACILLI

After four days' incubation in a bacteriological incubator at 37° C. the eggs are again candled and those containing dead embryos discarded. The yolk sac of one living embryo is examined on each successive day until acid fast bacilli can be demonstrated. A test is considered negative if no acid fast bacilli can be demonstrated following the consecutive daily examination of each of the 6 embryos inoculated. Either by means of cutting around the egg shell with the dental drill or picking away the shell at the blunt end the egg shell can be emptied by transferring its contents to

a sterile Petri dish. A 10 cc. pipette is used to transfer 2 to 3 cc. of the yolk to a 2.5 by 10 cm. sterile test tube. Enough sterile triple distilled water is added to bring the volume to 20 cc. To this pure phenol is added in sufficient amount to make a 15 per cent concentration. This step is important in the prevention of laboratory contamination and infection. The tube is sealed with a solid rubber stopper and vigorously shaken to insure thorough mixing. The mixture is allowed to stand in the vertical for at least two hours. At this time an extremely thin layer of oil fat has collected at the surface. By this means the bacilli are concentrated by flotation. A finely drawn capillary tube is then used to withdraw a small amount of the fatty layer by capillary attraction. This small drop is blown onto the center of the surface of a chemically clean slide. Another clean slide is placed over the original slide to allow the drop to spread evenly. The slides are then pulled apart leaving two thin smears, which after drying in the air and fixing by heat, are ready for staining.

STAINING AND MICROSCOPIC EXAMINATION OF SMEARS FROM YOLK SACS

New slides, free from scratches, cleaned in dichromate solution followed by washing in 80 per cent alcohol and then carefully wiped dry with a lint free cloth are essential. Only certified dyes are completely reliable. Stock carbol fuchsin solutions are prepared once a month. The working solution is prepared fresh daily and passed through filter paper immediately before use. Light green (yellowish) in 5 per cent aqueous solution is far superior to methylene blue as a counterstain for smears prepared from yolk. After light heat fixation the preparations are stained in the cold with carbol-fuchsin for three to five minutes according to the method described by Darrow.[7] Decolorization is done with 3 per cent hydrochloric acid in 95 per cent alcohol. After washing in tap water the light green counterstain is applied for one minute.

The numbers of acid fast bacilli which can be detected microscopically in the smear preparations will vary greatly from one specimen to another. In most instances there is a sufficient number to be detectable by searching from two to five minutes. Occasionally a longer search is required. Preparations are considered negative only when at least thirty minutes of thorough search reveals no acid fast bacilli.

DETERMINATION OF THE PATHOGENICITY OF ACID FAST BACILLI ISOLATED BY YOLK SAC CULTURE

Guinea pigs are used to determine the pathogenicity of the acid fast bacilli detected in yolk sac cultures. A young tuberculin negative animal is inoculated intramuscularly into the thigh with 0.5 cc. yolk from the first egg in each test in which acid bacilli are detected. The animals are tested with old tuberculin as soon as enlarged lymph nodes can be palpated. Positive reactors are then sacrificed and acid fast bacilli demonstrated in smears from typical search for tuberculous lesions.

In order to determine whether or not negative results obtained by examination of smear preparations are reliable a sample of yolk from the last egg of each test series in which no acid fast bacilli are demonstrable is inoculated into a tuberculin negative guinea pig. These animals are tested for sensitivity to old tuberculin at the end of thirty days and again at sixty days. The absence of tuberculous infection is then further substantiated by autopsy and a careful search for tuberculous lesions.

RESULTS

During the period from September 1, 1952, through March 30, 1953, 168 specimens of various types were subjected to the foregoing procedures to compare the results obtained from inoculation of the yolk sac of embryonated eggs with those obtained from the injection of guinea pigs for the isolation of *M. tuberculosis*. The results are summarized in Table 1.

Acid fast bacilli could be demonstrated in smears from the yolk sac of embryonated eggs four to seven days after inoculation with each of 79 specimens which produced tuberculous infection in the guinea pig. Acid fast bacilli could not be demonstrated in the yolk sac of embryonated eggs inoculated with each of 89 specimens which did not produce tuberculous infection in the guinea pig. The acid fast bacilli demon-

TABLE 1

COMPARISON OF THE SENSITIVITY OF THE GUINEA PIG AND THE CHICK EMBRYO YOLK SAC FOR THE ISOLATION OF *M. TUBERCULOSIS*

Specimen	Number G. P. Pos.	Number G. P. Pos. Y. S. Pos.	Number G. P. Pos. Y. S. Neg.	Number G. P. Neg.	Number G. P. Neg. Y. S. Pos.	Number G. P. Neg. Y. S. Neg.	Total
Spinal Fl.	37	37	0	29	0	29	59
Gastrics	16	16	0	21	0	21	37
Effusions	11	11	0	16	0	16	27
Tissues	7	7	0	9	0	9	15
Pus	4	4	0	9	0	9	13
Urine	2	2	0	3	0	3	5
Sputum	2	2	0	2	0	2	4
Totals	79	79	0	89	0	89	168

strated in each of the 79 positive specimens were proven to be pathogenic *M. tuberculosis* by inoculation into guinea pigs. No tuberculosis developed in guinea pigs injected with yolk from each of 89 embryos in which acid fast bacilli could not be demonstrated. Each of the noninfectious yolk specimens obtained from one of the embryos of the group of six inoculated with each of the 89 specimens was found noninfectious for the guinea pig. In this series the positive and negative results in guinea pigs and in the chick embryo yolk sac were identical.

DISCUSSION

These observations strongly support the conviction that inoculation of the yolk sac of 6 to 8 day chick embryos is equally as sensitive and reliable for the isolation of *M. tuberculosis* as is the usual routine method of inoculation of a single guinea pig with specimens obtained from patients suspected of tuberculous infection. It also appears to be as reliable as the inoculation of a single guinea pig for determining the absence of *M. tuberculosis* in the specimens tested. The chick embryo method has the distinct advantage of providing reliable positive information within four to seven days as compared with the guinea pig which usually requires from two to eight weeks. Negative evidence is available within ten days by the yolk sac method as compared with the usual eight to ten weeks required when guinea pigs are used. This advantage has previously been emphasized by the observations of McNelly and Riddell.[1] These investigators did not, however, provide too convincing evidence of the reliability of the method. Furthermore, they were inclined to favor chorio-allantoic inoculations over yolk sac injection and regarded the lesions developing in the membrane as more or less specific. It is readily conceded that sputum specimens from cases of known tuberculosis containing relatively large numbers of bacilli will produce recognizable lesions in the membrane within four to seven days. Whether or not specimens containing too few bacilli to be demonstrable upon direct examination will give the same results appears doubtful, but still remains to be determined.

Positive results obtained by the yolk sac method lack the nice specificity which the development of tuberculin sensitivity and the production of recognizable lesions obtained in the guinea pig. In the present series no nonspecific results were obtained in that no nonpathogenic acid fast bacilli were encountered. This possibility has been constantly kept in mind especially in the case of gastric washings and sputum specimens. McNelly and Riddell,[1] however, were unable to infect embryos by the membranal route with pure cultures of strains of nonpathogenic acid fast bacilli. The problem of the infectivity of nonpathogenic strains of *Mycobacterium* for the yolk sac is at present under investigation.

Experience with the method has thus far emphasized its great usefulness in the diagnosis of tuberculous meningitis, in patients with effusions and in the demonstration of acid fast bacilli in gastric washings. Its use has been especially impressive for pro-

viding current information by regularly repeated culture of spinal fluid at short intervals in cases of tuberculous meningitis under treatment.

The method described for the isolation of *M. tuberculosis* by inoculation of specimens into the yolk sac of the chick embryo can be readily adapted as a routine laboratory procedure. It should greatly facilitate and speed the more definite establishment of the diagnosis of tuberculosis and in ruling out the likelihood of tuberculous etiology in obscure chronic inflammatory processes. The average time required for positive results by the chick embryo method is five days; the guinea pig three weeks and the usual culture methods approximately one month. Negative reports can be made in ten days instead of eight to ten weeks.

CONCLUSIONS

1. Comparative studies have been performed which indicate that inoculation of the yolk sac of 6 to 8 days embryonated eggs with specimens from patients with suspected tuberculosis is as sensitive and reliable for the isolation of *M. tuberculosis* as is the usual method of inoculation of single guinea pig per specimen.

2. By the methods described acid fast bacilli typical of *M. tuberculosis* can be demonstrated in the yolk sac of embryos within four to seven days following inoculation with specimens in which the microorganism cannot be found by direct microscopic examination.

3. Acid fast bacilli demonstrated in the yolk sac after inoculation with each of 79 specimens of various types have been proven in each instance to be pathogenic *M. tuberculosis* by guinea pig inoculation. Yolk sacs in which acid fast bacilli could not be demonstrated six to ten days following inoculation were shown to be noninfectious for guinea pigs in 89 separate instances.

4. The use of the chick embryo for the isolation of *M. tuberculosis* by inoculation of the yolk sac is a feasible procedure for the routine laboratory diagnosis of tuberculosis.

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CORNEAL TRANSPLANTS*

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The concept of substituting a clear cornea for a clouded cornea goes back more than a century and a half. It was in 1789, as Paton[1] reminded the International Symposium on Corneal Surgery in 1949, that a member of the Montpellier Faculty first suggested that a piece of glass similar to a watch crystal be substituted for a completely opaque cornea. In his excellent historical review he noted other suggestions and developments made subsequently, among them that an opening for an artificial pupil be made in the sclera; that the scleral window be closed with a transplanted cornea of animal origin; that the cornea used for a replacement should not be transplanted to an opening in the sclera but should be used in place of the excised leukoma; and that a transplant from a cadaver be used. Among the numerous instruments developed for the transplantation operation was the trephine which von Hippel, in 1877, modified from a previous trephine and which, in modified form, is still used in all corneal transplants. Elschnig in Prague began to perform corneal transplan-

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†These remarks were prepared to accompany a moving picture on corneal transplantation, covering the technique and including a complete case demonstration, presented at the Seventy-third Annual Meeting of the Louisiana State Medical Society May 8, 1953, in New Orleans.

tations in 1908, and by 1930, had recorded 203 operations. Exactly when Filatov began to use the operation is not clear, but by 1938 he could put on record 436 transplantations, chiefly performed with eyes secured from living subjects.

The year 1938 marks the beginning of activity in this field in America. Since then there have been great technical advances in the operation. The number of surgeons trained to perform it has steadily increased and it is now available in most parts of the country. It has been estimated that there are at least 15,000 persons in the United States who are blind from corneal disease and who might be helped by corneal transplantation if only the supply of donor material could be increased. Not the least important of the advances in corneal transplantation in the last several years is, therefore, the establishment of the Eye-Bank for Sight Restoration, Inc., which provides the indispensable material for the operation, and of which the Southern Bank, in New Orleans, is one of the regional branches.

TECHNIQUES

Several techniques have been devised for corneal transplants:

1. Rotating autokeratoplasty is theoretically sound but is not as successful as procedures which employ donor grafts.

2. The lamellar graft (superficial lamellar keratoplasty), which was developed in Europe, is the only procedure possible in certain conditions, particularly recurrent pterygia, epithelioma, symblepharon, neuroherpetic keratitis, and bullous keratitis following intraocular surgery. It is the only useful operation in some active ulcers of the cornea.

3. The partial penetrating operation, however, which utilizes a button of full-thickness cornea, is the most generally applicable technique.

4. Total penetrating keratoplasty is a development of the last three years. As late as 1947, McLean[2] stated, at a symposium on corneal surgery, that it was not feasible theoretically and not successful clinically. In 1951, however, Castroviejo[3] reported 21 cases which he had handled by this technique over the preceding ten months, with most encouraging results: Thirteen transplants, observed from two to ten months, were either clear or nebulous, and 12 of the 13 patients had improved vision; in the remaining case the operation was done only for cosmetic reasons. Castroviejo had frankly extended the indications for operation, using it in such conditions as dense corneal vascularization unsuitable for preliminary irradiation, dense total opacities, total anterior synechias, corneal staphyloma, and, occasionally, cases in which partial keratoplasty had failed.

INDICATIONS AND CONTRAINDICATIONS

Corneal transplantation requires a careful selection of cases, with each patient considered as an individual problem set in the general framework of indications and contraindications. Age, physical status, and psychologic and emotional make-up are all important. The operation is seldom indicated in a one-eyed patient. It is never indicated if iridectomy could be performed successfully. When the sight is 20/200 or better, corrected, in either eye, the operation would not be indicated except under special circumstances. One of our own operations, for instance, was performed for keratoconus, in a 30-year-old bookkeeper.

The indications for operation may be roughly classified as follows:

1. The most favorable indications include mild keratoconus, moderate central scarring, and mild interstitial keratitis.

2. The next, less favorable indications include hereditary dystrophies, extensive superficial corneal opacities without vascularization, adherent leukomas, central descemetocele, and extensive interstitial keratites.

3. Frankly unfavorable indications include corneal scarring which involves both the limbus and the pupillary area; extensive deep leukomas, particularly those which follow alkali burns; certain band-shaped degenerations; opacities associated with vascularization of the pannus; dystrophia adiposa corneae; and aphakia.

4. Corneal transplantation is ordinarily regarded as contraindicated in a number of

conditions, including Fuchs' endothelial and epithelial dystrophy, total corneal opacification, calcareous degeneration, massive anterior synechias, recent uveitis, glaucoma, macular degeneration, and other severe retinopathies, pemphigus, xerophthalmia, nonparalytic lagophthalmos, trichosis, atrophic blepharitis, and myopic degeneration. In the latter disease there is danger of retinal detachment and the results are usually poor even if the graft remains clear.

On the surface, this is a formidable list of contraindications and of conditions in which the outlook for success varies from moderately favorable to poor. It is not, however, as discouraging as it seems. In a number of these conditions preliminary therapy can so alter the situation that a case which was formerly unfavorable becomes more favorable, or actually favorable. Irradiation, for instance, can be used to reduce or obliterate corneal vascularization. Keratectomy, with or without plastic repair, can be used in symblepharon. Iridectomy is useful in anterior synechias. Glaucoma may respond to various measures. Castroviejo even recommends total penetrating keratoplasty for such conditions as Fuch's dystrophy, in which lamellar keratoplasty is absolutely contraindicated because if it fails, the sight is made worse.

COMPLICATIONS

To the properly trained ophthalmic surgeon corneal transplantation should present no more difficulties than any other intraocular surgery. The technique, however, must be precise, for most of the complications which follow the operation can be attributed to technical errors. Thus a defect or an irregularity in either the graft or the recipient cornea may be the result of faulty fixation of the graft in the wound or the result of differences in the thickness of the donor graft and the recipient cornea. Other possible complications include delayed formation of the anterior chamber, prolapse of the iris, postoperative hemorrhage, infection, secondary glaucoma, anterior synechias, iridocylitis, and vascularization and early or late clouding of the graft.

Again the outlook is not as discouraging as it might at first seem to be. Most of these complications can be prevented, and if they occur, they can often be corrected by prompt and energetic treatment, so that a satisfactory outcome may still be obtained.

PROGNOSIS AND RESULTS

Another encouraging aspect of the apparently discouraging list of relative and absolute contraindications to keratoplasty appears in an anlysis of end-results. Roberts,[1] in 1950, analyzed a representative series (100 cases) of partial penetrating keratoplasties performed at the Manhattan Eye and Ear Hospital, which had been followed up for four months or more, as follows:

1. When the cases were classified from the standpoint of preoperative prognosis, the results were good in 82.7 per cent of the favorable cases, in 69.4 per cent of the less favorable cases, in 31.3 per cent of the unfavorable cases, and in 10 per cent of the cases in which the operation is ordinarily regarded as contraindicated.

2. When results were analyzed according to the size of the opacity, they were good in 74.3 per cent of the cases in which the scar was central, in 67.6 per cent of the cases in which it occupied up to half the cornea, and in 36.9 per cent of the cases in which it occupied more than half of the cornea.

3. When results were analyzed from the standpoint of vascularization, they were good in 71.7 per cent of the cases in which there was no vascularization, in 45.5 per cent of the cases in which vascularization was slight, and in 22.7 per cent of the cases in which it was moderate. Both instances of total vascularization were complete failures.

What stands out in this analysis of results is the fact that even in frankly unfavorable cases, fair to good results were sometimes achieved. Thus, some 10 per cent of the patients were benefited in the group in which operation would ordinarily be regarded as contraindicated. More than a third were benefited when scarring occupied more than half of the cornea, and more than 20 per cent were benefited when vas-

cularization of moderate degree was present. Results in the latter category should be even better now, since it has been shown that preliminary irradiation can convert unfavorable to more favorable categories.

SUMMARY

Corneal transplantation is an operation of increasing availability and increasing promise. Even when the outlook is less than favorable, good results can sometimes be accomplished.

Indications, grouped according to prognosis, are listed, and techniques and results are briefly discussed.

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NATURE AND MANAGEMENT OF CARDIAC ARREST*

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NEW ORLEANS

INTRODUCTION

Cardiac arrest may be defined as completely ineffective heart action. Sudden stoppage of effective heart action as a terminal event in severe heart disease is of little moment, but cardiac arrest occurring in an individual in whom adequate cardiac function remains is a tragedy indeed. Such arrest may occur in the operating room, in the accident room, during cardiac catheterization, or during simple diagnostic and therapeutic procedures such as thoracentesis. This complication is so devastating, its occurrence demands such prompt and vigorous therapy, and the fact that it can usually be prevented, all demand a clear-cut understanding of the principles involved.

Cardiac arrest has been estimated to occur about five times a year in an average 700 bed hospital. Stephenson and associates have collected over 1,200 cases.[7] In this group 72 per cent ended fatally. Ninety per cent occurred as arrest in diastole (asystole) and 10 per cent as ventricular fibrillation. Twenty per cent occurred in children under 10 years of age. The incidence is governed by the age and cardiac status of operative patients, the magnitude and character of the operative procedures performed, and the management of the patient before and during the operative procedure. Cooley's report[2] of an incidence of 5.5 per cent in 878 patients operated upon for pulmonic stenosis illustrates the high incidence in very ill cardiac patients for whom a major vascular operation is necessary. An inordinately high incidence has been reported from some hospitals and communities in which poor medical and anesthesia practices have been common.

Prevost and Batelli, in 1899,[6] successfully defibrillated the hearts of cats. Four decades later Carl Wiggers[8] through experimental studies placed the management of ventricular fibrillation on a sound theoretical and practical basis. In 1947, Beck and associates[1] reported the first successful defibrillation of a human heart. Beck and his group have led the way in the understanding and the clinical management of this problem. I am indebted to them for the opportunity to take a stimulating course in cardiac resuscitation at the Western Reserve University School of Medicine in June 1952.

The basic general principles of this condition are:

1. Cardiac arrest may occur during any operation with any type of anesthesia.
2. Cardiac arrest never occurs without warning.
3. Cardiac arrest should never occur.
4. Prevention and treatment of cardiac arrest demand eternal vigilance.
5. Resuscitation must begin the instant arrest occurs.

Almost without exception the occurrence of cardiac arrest is preceded by premonitory signs which warn of impending dis-

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aster. Prompt, intelligent management at this time will prevent the development of cardiac arrest. The statement that, "the patient was doing well without any difficulty of any kind until suddenly the heart stopped beating," indicates careless observation on the part of the attending physicians.

Cardiac arrest may be classified as follows

A. Arrest with diastolic filling of the heart
   1. Standstill in diastole—90 per cent
   2. Ventricular fibrillation — 10 per cent.

B. Arrest without diastolic filling of the heart—very rare
   1. Failure to dilate in diastole
   2. Standstill in systole.

With standstill in diastole, all visible heart action ceases with the heart gradually dilating as it fills with venous blood. In ventricular fibrillation, atrial contractions continue but only a tremor occurs in the ventricular myocardium, again with progressive dilatation. With failure to dilate in diastole normal rhythm of the atria and ventricles persists, but because the heart does not dilate in diastole no cardiac filling (or emptying) can occur. During standstill in systole the myocardium remains in a tetanic-like spasm, again preventing cardiac filling and emptying.

Fortunately the conditions in which diastolic filling of the heart occurs account for almost 100 per cent of the cases. In the presence of diastolic filling it is possible to restore a degree of circulatory effectiveness by massage of the heart. Cardiac rehabilitation is then possible. When diastolic filling of the heart does not occur massage is ineffective, and the mechanismal disturbance of the heart must be corrected within three to five minutes or the patient will die.

Standstill in diastole usually occurs in deep anesthesia and represents a poisoning of the myocardium. It is by far the most common form of cardiac arrest, and responds the most readily to treatment. Ventricular fibrillation frequently occurs in relatively light plane anesthesia. It is difficult to manage as it must be converted first to standstill in diastole and then to normal sinus rhythm. The tremor of the ventricular muscle is coarse at first, but becomes finer as time passes, and finally leads to a completely inactive myocardium.

PREDISPOSING FACTORS

Many factors may predispose to cardiac arrest. The most important ones will be discussed in the approximate order of their importance. Unquestionably the most important single factor is hypoxia, the inadequate supply of oxygen to blood because of inadequate ventilation or ineffective gaseous exchange. Unfortunately, the diagnosis of this condition is extremely difficult as gross cyanosis occurs only with advanced states of hypoxia. An oximeter is of some assistance in fair-skinned individuals. Hypoxia gives rise to cardiac weakness and sensitivity which sets the stage for other factors to precipitate cardiac arrest.

Hypercapnia and acidosis are considered important predisposing factors. Miller and associates[5] have demonstrated posthypercapnic cardiac arrhythmias and/or arrest following sudden reversal of the hypercapnic state by rapid hyperventilation. The diagnosis of hypercapnia is difficult, and there are no recognized clinical signs.

A contracted blood volume and hypotension result in poor transport of oxygen to, and metabolic end-products away from, the myocardium and other tissues of the body. A period of shock with resultant tissue hypoxia sensitizes the myocardium to noxious stimuli.

The quality of anesthesia is an important factor. It is apparent that the most important factor in anesthesia is the ability of the anesthetist to provide adequate anesthesia while maintaining oxygenation. The differing sentiments among experienced anesthetists for or against cyclopropane, pentothal, or ether indicate the primary importance of the ability and alertness of the anesthetist rather than the particular agent employed. In bad risk cardiac cases we prefer induction with cyclopropane and maintenance with ether, at all times with a high concentration of oxygen. One thing is

certain, that the use of multiple anesthetic agents compounds the hazards and the confusion. A "little bit" of each of half a dozen agents is far more dangerous than an accurately controlled quantity of a single reliable agent with plenty of oxygen. Overly rapid induction is hazardous. The agents with the widest margin between adequate anesthesia and toxicity are the anesthetics of choice. Ether, in our opinion, remains in a class by itself.

Impulses from the operative field, or from respiratory passages, may give rise to serious mechanismal changes and even cardiac arrest. This is the so-called "vago-vagal reflex" because both the afferent and efferent impulses travel over the vagus nerves. The impulses tend to shift the pacemaker downwards, to cause bradycardia, multiple ectopic ventricular impulses, and finally idioventricular rhythm or even ventricular fibrillation. These changes frequently occur in relatively light planes of anesthesia. It is probable that in every instance other metabolic factors predispose to the occurrence of these irregularities. Manipulation, and particularly displacement of the heart, lead to difficulties by interfering with cardiac filling.

Although cardic arrest may occur during any type of operation, and with any type of anesthetic agent, it occurs most commonly in chest operations, and particularly during operations on the heart and great vessels in patients with severe myocardial disease. As cited above[2] the Johns Hopkins hospital incidence of 5.5 per cent in 878 patients operated upon for pulmonic stenosis illustrates the high incidence in this type of case. In a five-year experience at the Western Reserve University Hospital[4] cardiac arrest occurred during 14 chest operations, during 11 obstetrical and gynecologic procedures, during 9 gastrointestinal operations, and in 9 other cases. The longer the operation, the greater the hazard becomes, although a good long anesthesia is less dangerous than a poor short one.

The nutritional status and electrolyte balance affect the myocardium as well as other tissues. The preoperative cardiac competence is extremely important and every effort should be made to bring the myocardium to its optimum efficiency. As a corollary the nature and severity of underlying heart disease is of great importance. Any pulmonary disease which interferes with adequate oxygenation of the blood in the lungs increases the hazards of cardiac arrest.

There is clinical evidence that anxiety increases a patient's difficulties. This effect is probably mediated through excessive epinephrine excretion. We have seen severe tachycardia develop with the induction of anesthesia in apprehensive individuals. The excessive use of any drugs, but particularly cardiac or respiratory depressants, predispose to cardiac standstill. Anemia contributes to myocardial and tissue anoxia by interfering with oxygen transport to the tissues. Age is a predisposing factor as the incidence of arrest is high in the very young and the very old.

WARNING SIGNS OF IMPENDING DISASTER

Cardiac arrest almost never occurs without warning. Among the signs are: changes in respiration, cyanosis, hypotension unrelated to blood loss, tachycardia, bradycardia, the displacement of the pacemaker downwards, the occurrence of repetitive ectopic beats, change in A-V or I-V conduction, electrical or mechanical alternation, or unexplained changes in the level of anesthesia.

DIAGNOSIS OF CARDIAC ARREST

Cardiac arrest is diagnosed by the disappearance of the pulse, in the absence of peripheral vascular collapse. The absence of a pulse is usually first noted by the anesthetist in a peripheral artery. It should immediately be checked in the nearest available large artery. The absence of a palpable pulse establishes the diagnosis. Time should not be wasted in confirmation by auscultation or by electracardiography. It is true that in some instances on opening the chest feeble cardiac impulses wil be observed, in place of true cardiac arrest, but this too, is best treated by cardiac massage, adequate oxygenation and possibly adrenalin.

PRINCIPLES OF TREATMENT OF CARDIAC ARREST

The successful management of established

cardiac arrest rests on the following basic principles:

1. Have necessary equipment available.
2. Have a definite plan of action.
3. Execute the plan of action with the precision of a fire drill.

This demands planning and practice. When cardiac arrest occurs it is too late to assemble equipment, and to plan and execute a course of action.

EQUIPMENT FOR TREATING CARDIAC ARREST

Only the simplest equipment is needed and it consists of the folowing:

Knife	1 10 cc. plain tip syringe
Scissors	1 10 c. metal tip syringe
A few clamps	2 long, No. 22 needles
Rib Spreader	20 cc. 1 per cent procain
2 medicine glasses	1 cc. 1:1,000 adrenalin

Physiologic saline solution, pyrogen free.

The only special equipment needed is an electrical defibrillator. A number of inexpensive models are available. Any competent electrician can assemble one from readily available equipment. We have used the Rand* defibrillator with satisfaction. Although ventricular fibrillation is a relatively infrequent type of cardiac arrest, it does occur in 10 per cent or more of cases, and electrical defibrillation is the only reliable means of stopping the fibrillation. The defibrillator should deliver, through the heart, a current of about 1.5 amperes with the usual 110 volt A. C. current. To do that it should deliver about 3.5 amperes with the electrodes in direct apposition. With a very large heart a somewhat larger current may be necessary. In an emergency the bare wires from the usual house current may be connected to Deaver retractors which may be applied to the heart. Care must be taken not to shock the operator.

TECHNIC OF MANAGEMENT OF CARDIAC ARREST

It is essential to get oxygen into the lungs and through the blood to the essential organs, the brain and the heart, during the interval of cardiac ineffectiveness; and then to restore cardiac activity at the earliest possible moment. The circulation must be restored to the brain within three to five minutes or irreparable damage will occur. Artificial respiration and cardiac massage must be established within this time interval and the sooner the better.

DUTIES OF THE ANESTHETIST

The anesthetist must be eternally vigilant because the essential, instantaneous recognition of cardiac arrest depends upon his alertness. It is even more important that he recognize the premonitory signs so that cardiac arrest may be prevented. He should *never*, under any circumstances, leave the patient from the beginning of induction until recovery from anesthesia, or until the postoperative care has been entrusted to some other competent observer. He should notify the surgeon of any changes in the patient, warning of impending cardiac arrest. He should immediately notify the surgeon of an absent pulse, and note the time. Anesthesia should be discontinued, an intratracheal airway immediately established if not already present, and artificial respiration with 100 per cent oxygen begun. The surgeon should be notified when three minutes have elapsed. The head of the table should be lowered slightly to facilitate return of blood to the heart, and to encourage circulation to the brain. If there is any reason to suspect a reduced blood volume he should, in consultation with the surgeon, direct transfusion therapy. If cardiac arrest continues for any length of time there is a tendency for the vascular bed to expand and further transfusion with whole blood is indicated.

DUTIES OF THE SURGEON

On suspicion of cardiac arrest, or on notification by the anesthetist that the peripheral pulse is absent, the surgeon should check the pulsation of the nearest available major artery. If the chest is open, the heart itself is visualized. If the abdomen is open the aorta is palpated. Even if the abdomen is closed the aortic pulsation can be felt normally except in obese individuals. If a palpable pulse cannot be felt, and there is no reason to suspect peripheral circulatory collapse from shock, the diagnosis of cardiac arrest must be made. Without antiseptic preparation of the skin an intercostal in-

*H. J. Rand Foundation, 12720 Lake Shore Boulevard, Cleveland 8, Ohio.

cision is made in the left chest in the general region of the heart. The right hand is inserted through this incision and cardiac massage begun. Because there is no need for hemostasis, this procedure should be accomplished in fifteen seconds, and massage instituted within thirty seconds of the time the anesthetist reports an absent pulse.

After cardiac massage has been begun, better exposure is obtained by the insertion of a rib spreader, and in adults the two adjacent ribs are divided. The pericardium is opened and more effective massage carried out. The heart may now be examined to determine whether any cardiac activity is present, and whether it exhibits feeble contractions with a normal rhythm, complete inactivity, or ventricular fibrillation. If feeble normal contractions were present on opening the chest, the initial period of adequate oxygenation and masage may restore normal heart action. This may also prove true with complete arrest in diastole. With ventricular fibrillation there is initially coarse fibrillation of the ventricular muscles. These fibrillations rapidly become finer and then disappear completely so that the heart may have the appearance of complete standstill in diastole.

In cases where normal sinus rhythm persists but diastolic relaxation does not occur, the auricles and ventricles may be seen to contract regularly but there is no diastolic relaxation of the heart. In standstill in systole there is no cardiac activity, the ventricles being fixed in a state of systolic spasm. The electracardiograph may prove useful in the differential diagnosis. The descending thoracic aorta is occluded with a noncrushing clamp to direct all of the circulating blood to the heart and brain.

If diastolic filling of the heart is not occurring, cardiac massage is completely ineffective. Little is known about the management of these extremely rare conditions but it would seem wise to apply 5 to 10 cc. of 1 per cent procaine to the surface of the heart and to inject 5 to 10 cc. into the left ventricle immediately and continue massage hoping that myocardial relaxation will occur. These conditions are desperate because myocardial relaxation must occur within three to five minutes or irreparable cerebral damage will occur. We have observed failure to dilate in diastole in one case of an 11 year old girl with a very large patent ductus arteriosus, pulmonary hypertension and partial right to left shunt through the ductus. About fifteen minutes after application of a clamp to the ductus cardiac arrest occurred. Auricular and ventricular contractions of apparently normal character continued but diastolic relaxation failed to occur. Cardiac arrest was recognized instantly and masage begun but it was not until one to two minutes had elapsed that the unusual character of the arrest was appreciated. We did not know what should be done. It was finally decided to use procaine but at that time, six minutes after the onset, normal heart action was restored spontaneously (without the removal of the ductus clamp). The ductus was quickly ligated and the chest closed. Spontaneous respiratory action returned but the child died after six hours with usual signs of severe cerebral damage.

Effective massage is the result of practice and any surgeon who may be faced with the complication should practice the manipulations on a dog. The two ventricles must be encircled by one or two hands depending on the size of the heart. Compression of the heart against the sternum is less effective and more traumatizing. Gentle pressure will empty the ventricles and it should be remembered that the ventricular chambers contain large papillary muscles so that chamber compression need not be too vigorous. There is experimental evidence[3] to indicate that the more rapid the massage the more effective the circulation. From the practical point of view a rate of 60 to 80 per minute is all that can be maintained, and it is necessary for two men to spell each other at short intervals to keep this up. With adequate massage a palpable peripheral pulse should be restored, and a systolic blood pressure in the neighborhood of 60 to 80 mm. of mercury should be maintained.

With the delivery of high concentrations of oxygen to the lungs, the objectives of

cardiac masage are to deliver enough oxygen to the brain to protect it from irreparable damage, and to deliver enough oxygen to the myocardium so that it will either spontaneously begin normal activity or it will be able to respond to appropriate stimuli.

In cases of standstill in diastole (asystole) massage is effective in maintaining circulation and, with adequate oxygen supply to the lungs, spontaneous heart action will often return. If cardiac action fails to return, or only feeble, ineffective contractions occur, adrenalin is the treatment of choice. An ampoule of 1 cc. of 1:1000 adrenalin is diluted to 10 cc. in normal saline and 3 to 4 cc. of the resultant 1:10,000 dilution is injected into the right ventricle after the myocardium has been well oxygenated. Massage is reinstituted. Rapid, vigorous heart action should ensue. If it does not, a slightly larger dose may be given after the myocardium has been again oxygenated. Epinephrine is the most effective agent for correcting standstill in diastole, but occasionally 10 cc. of 5 per cent calcium chloride solution will be effective after epinephrine has failed. Ventricular fibrillation may result, particularly if large doses of adrenalin are used.

With ventricular fibrillation large segments of the myocardium are always in the refractory phase so that a normal sinus rhythm cannot be reestablished until the fibrillation is stopped and a standstill created. The preliminary manoeuvres of oxygenation of the lungs and cardiac massage are the same as with cases of standstill.. The only effective means of interrupting the ventricular fibrillation is by a sudden electrical shock. After myocardial tone has been restored by ventilation of the lungs with oxygen, and cardiac massage, a current of 1.5 amperes, of a 110 volt A. C. current, is passed through the myocardium of the ventricles. Large electrodes (7 cm. or more in diameter) should be used to diffuse the current through the heart. With a very large heart a stronger shock may be necessary, and it is sometimes necessary to use a series of shocks at short intervals to stop the fibrillation. Each shock is for 0.5 to 2.0 seconds.

If defibrillation is effective, gentle cardiac masage is again begun and normal heart action restored. If the cardiac action repeatedly reverts to fibrillation after successful interruption, 3 to 4 cc. of 1 per cent procain solution may be injected into the right ventricle to reduce the sensitivity of the myocardium. It may then be possible to effect permanent defibrillation. Because procain is a myocardial poison it should not be used routinely, as the resultant sluggish myocardium responds less well to stimuli. If resuscitative steps are apparently ineffective, they should nevertheless be continued until there is no myocardial response to stimulation.

If normal cardiac action is restored, spontaneous respiratory activity will often follow. It is imperative that the patient be watched in the operating room for a long time. After the patient has remained stable for some time he may be moved to the recovery room, but it is necessary that constant attention by a physician be maintained for at least twenty-four hours. Everything needed to treat a recurrence of cardiac arrest, should be available at the bedside.

TYPES OF RESPONSE TO TREATMENT

There may be no restoration of either cardiac or pulmonary action and death ensues. In some cases cardiac action develops but spontaneous respirations never occur and death follows. Sometimes heart and lung function returns but the brain has received irreparable damage. In the early postoperative hours the temperature rises rapidly, restlessness and even convulsions may occur, with death following in six to twenty-four hours. Occasionally the vital functions are restored but a progressive hypotension appears in the first six to twelve hours in spite of adequate blood replacement. It is thought that this may be due to adrenal cortical insufficiency. If recovery from cardiac arrest occurs, there is usually no permanent cerebral damage. The risk of having a decerebrate survivor is not great.

PREVENTION OF CARDIAC ARREST

The technique of treatment of cardiac arrest is relatively simple, and the correct management can be easily learned. But cardiac arrest remains a very serious complication and even with the best treatment recovery occurs in a minority of cases. It is far more important, and infinitely more successful, to prevent cardiac arrest rather than to treat it. The principles of the prevention of cardiac arrest are: (1) Avoid or correct predisposing factors (see above). (2) Employ frequent rest periods for the heart and lungs if they are manipulated during the operative procedure. (3) If warning signs of arrest appear it is imperative to immediately stop, look, and oxygenate the lungs. (4) If danger signals persist the operation should be discontinued.

Preoperative preparation involves the use of digitalis in cases of congestive failure, with mercurial diuretics prescribed if there is evidence of water retention. Several days of bed rest, observation and treatment are necesary to restore the myocardium to its maximum efficiency. Atropine is the only "routine" preoperative medication. It is given to reduce bronchial secretions, and to discourage the appearance of vagal reflexes. It must be used cautiously in cases of valvular stenosis of the heart, because a severe tachycardia may develop and lead to circulatory collapse.

Quinidine is exhibited if multiple ventricular premature contractions are present. It is to be remembered that quinidine acts only for two to four hours. It is, therefore, necessary to give it immediately before the operation, and to repeat it during a long operation. In cases where auricular flutter or fibrillation develops, quinidine may be used in an attempt to convert to a normal sinus rhythm. If this fails, digitalis should be used to slow the heart rate. Digitalis should be used first in cases of auricular flutter with failure. In cases of frequent paroxysmal tachycardia, quinidine is again indicated.

Anxiety should be avoided. The increased output of adrenalin may precipitate serious complications. A good rapport should be established with the patient, and fears allayed by patient and hopeful descriptions of the operation. A good night's sleep brings the patient to the operating theatre rested and refreshed. Preoperative morphine allays alarm and provides basal analgesia.

During operation special precautions should be taken. The highest possible concentration of oxygen should be delivered to the lungs at all times, and the circulation should be carefully maintained at maximum efficiency. Blood should be replaced as it is lost. Frequent or multiple premature beats suggest reflex stimuli from the operative area. One per cent procain injected into the area of manipulation is usually effective. Quinidine may be helpful.

If tachycardia develops, it is important that its character be determined. Electrocardiography may be necessary. Sinus tachycardia is a physiologic mechanism and no medicaments will alter it. If sinus tachycardia becomes severe the operation must be stopped and the procedure completed another day. Paroxysmal supraventricular tachycardia indicates reflex vagal stimulation. Stimulation of the carotid sinus may be tried. Parenteral quinidine therapy has proved effective. If that fails, rapid parenteral digitalization may be employed. Paroxysmal ventricular tachycardia is best treated by quinidine.

Bradycardia is a significant danger signal and indicates undue reflex vagal activity. If practical, procain should be injected locally into the operative area, atropine should be given, and all manipulations discontinued. If a sinus bradycardia responds to this treatment, the operation may be cautiously continued. In the case of an A-V heart block, oxygen is particularly important. Local procain and atropine should be employed and the operation should be immediately terminated. If the pacemaker shifts downward to the A-V node or to the ventricle all manipulations should cease and procain and atropine should be administered.

Cedalanid is probably the most rapid and reliable form of therapy for auricular flut-

ter or fibrillation developing during operation. Quinidine is less reliable.

If hypotension not due to blood loss develops, norepinephrine (levophed) should be administered in an intravenous drip at a rate to maintain the circulation. The operation should be terminated as rapidly as possible.

Oxygen under positive pressure should be given for acute pulmonary edema. Rapid digitalization with cedalanid is indicated, and phlebotomy should be performed if necessary. Temporary "phlebotomy" may be performed by the application of tourniquets to the four extremities to occlude venous return. Every fifteen minutes one tourniquet at a time may be released for a few moments.

CONCLUSIONS

1. Cardiac arrest may occur during any operation with any type of anesthesia.

2. Cardiac arrest never occurs without warning.

3. Cardiac arrest should never occur.

4. The prevention and treatment of cardiac arrest demand eternal vigilance.

5. Resuscitation must begin the instant arrest occurs and, to be effective, must follow a prearranged plan with the precision of a fire drill.

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PSYCHIATRY AND PUBLIC OPINION*

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In discussing the psychiatrist and the public you will, of course, recognize the abstractions and the stereotypes with which we are dealing. There is, in actuality, no such creature as "*the* psychiatrist." There are many different kinds of individuals who practice the art or pursue the science of psychiatry. They may have little in common as to background, culture, marital status, political or religious persuasion; and yet the public tends to lump them all together.

Nevertheless, as Paul Haun[1] has stated:

"I believe that psychiatry is a medical specialty and that its theories, techniques, responsibilties and practices are as integral a part of medical science as are those of surgery and obstetrics. As a consequence of this conviction, I oppose the practice of psychiatry by any professional, subprofessional, or nonprofessional individual who is not a physician."

In other words, every psychiatrist is a physician. The better versed he is in pathology, diagnosis, and treatment of human ailments, the more understanding he will be concerning the problems of emotionally and mentally ill patients. Burlingame has well said that "psychiatry and medicine are inseparable."

The public, and I am now using another stereotype, or abstraction, is given to certain preconceived notions about psychiatrists which often come out in the form of certain well worn clichés, such as: "I don't like psychiatrists because they can see right through you," or, "they always ask the most outrageous questions" or, "I should think they would go crazy with all the unbalanced people they come in contact with." But perhaps the commonest view is that a psychiatrist is alien and grotesque, if not ridiculous and sinister. This is often reflected in the jokes and cartoons published in the popular layman's magazines.

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However, the psychiatrist is not the only one that has been the butt of derision by the man in the street. The red and white pole outside a barber's shop reminds us of almost forgotten days in medical history when physicians looked down upon surgeons, and surgical procedures such as blood-letting were relegated to nonprofessional persons. Even today in British countries surgeons keep, as a sign of distinction, the title "Mister," which their colleagues once used to indicate their exclusion from the profession. Surgery today is thoroughly integrated with medical practice, and surgeons since the days of Pasteur and Lister have placed their art on a highly scientific basis. There is some parallel to this historical situation in the changing status of psychiatry today. Most psychiatrists have felt in the past that their medical colleagues have had but little regard for the medical significance of their work.

An internist, in a moment of heated discussion, said to a psychiatrist who had years of general practice before specializing, "You used to be a doctor!" Thoughtful physicians now recognize that recent tendencies toward regarding human beings as biologic machines have led to serious diagnostic and therapeutic errors. The rapid mounting of interest in psychosomatic medicine attests the readiness of the profession generally to learn about and apply knowledge of their patients as people. The vast role of emotions in the production of illness being acknowledged, psychiatrists are now being called upon to elucidate the genesis of anxiety and the manner in which it may produce illness. This welcome development places sudden and conspicuous responsibilities upon psychiatrists. Having worked and waited for the opportunity now offered, they must take full advantage of it now that it has arrived.

In the past, the attitude of many physicians toward psychiatry was that it offered chiefly only three things: (1) some form of shock therapy, (2) custodial care, (3) some type of brain operation. Psychotherapy, the backbone of psychiatry, was left out entirely. The attitude was that psychiatric interviews are only conversational. The impression was that occasional patients might be successfully treated by interview, but this was accomplished by one or two interviews only.

Fortunately, these erroneous views are disappearing. Concurrently with *medical* awakening has come great social concern over the extent of neuropsychiatric disability as dramatized by World War II. The tendency to dramatic and threatening exposés of conditions in state hospitals is abating. The few who have tried to do something for the sick under utterly discouraging conditions of public neglect and suspicion, lack of funds, antiquated crowded buildings, and woefully inadequate personnel should not be held responsible for a state of affairs no one condones. The responsibility belongs to those who have not tried to do anything for these unfortunate outcast sick. Realizing this, thoughtful leaders are giving positive support in very practical form. We are singularly fortunate in the willingness of the people, their representatives in the legislature, the executive office, the press, the university, and the medical profession to unite in a well-planned, properly equipped and financed all-out effort to care adequately for the emotionally sick, carry on research to increase our knowledge, and develop a far reaching mental hygiene program. We have a great opportunity and responsibility for leadership in this program. The best efforts and ideas of all will be needed in well coordinated teamwork to be worthy of the occasion.

The psychiatrist must make every effort to enlist the active cooperation of all physicians. They will not be found unwilling, but psychiatrists, from their own experience know the limited foundation, if any, their medical education gave them. Psychiatry must get closer to internal medicine, for intricate physiology and neurology are concerned in psychosomatic reactions and psychiatrists must keep up their general medical knowledge. General practitioners and specialists alike need to become better acquainted with psychiatry and mental hy-

giene. The logical meeting place is in staff conferences and joint rounds, and encouragement of general hospitals to add psychiatric services will contribute greatly to this objective. Preventive medicine has shown convincingly that assurance and protection of health greatly reduce later incidence of illness. Mental hygiene programs to be effective much reach individual children and adults in their own homes and communities. Localities must be encouraged to take active part in health measures. Cooperation with public health physicians can be of great assistance in this. Coupled with prevention is early diagnosis. This also must be carried out at the community level. Child guidance clinics, adult mental hygiene clinics, and psychiatric services of general hospitals are primary resources to be developed to utilize the therapeutic advantages gained when trouble is detected near its inception.

In the past, psychiatry has been narrowly construed as concerned with severe and far advanced types of reaction which come within the general designation of mental illness or psychosis. Gradually, the much more prevalent psychoneurotic reactions were added. With much more difficulty, the idea is being accepted that quarantine in jail or punishment as deterrents both overlook the fact that the delinquent and criminal are socially ill. This broadened concept now gives us the wide range of all forms of human maladjustments as a medical concern.

The narrowness of background experience in state hospitals has proved inadequate to our needs. Let me amplify this statement by saying these same state institutions given the necessary financial aid will be centers of treatment and psychiatric learning that the state will be most proud of. Say what you may, at the present time, state institutions are the backbone of psychiatry in our country today, in spite of the difficulties and handicaps they must operate under. Diversified education is needed to meet such extensive and complicated coverage as we now are called up to make. Teamwork can accomplish much that individuals cannot, and allows intensive development of special abilities. In hospitals and clinics teamwork among psychiatrists, internists, neurologists, neurosurgeons, neuropathologists, clinical pathologists, biochemists, anatomists, and all branches of the medical sciences has demonstrated its efficiency and effectiveness. In individual instances this team links up with others in the community, such as social workers and agencies, judges and courts, clergy, and interested lay groups. Such teamwork needs to be encouraged, and educational opportunities must be provided to assure a supply of all types of personnel if an extensive program is to be possible. These teams should be quarterbacked by top level psychiatrists.

Education is fundamental to the provision of adequate numbers of suitably trained personnel. The awakening of medical schools is quickly overcoming the deficiencies of the past. Students as undergraduates are obtaining much more foundation in mental hygiene and psychiatry than even a decade ago. This, in the future, will aid collaboration of physicians in all aspects of medical practice with psychiatry and mental hygiene. Many of the earlier and less severe problems can be handled where they are most accessible—by general practitioners—that are now either missed or referred to others. Graduate education in psychiatry must work out complicated problems. State hospitals often have men come for early experience and education, but are not able to give a graded experience. Psychoses and late illnesses generally are the most difficult of psychotherapeutic undertakings. Inexperienced persons should no more attempt such complex therapy first than should a new surgical resident attempt to remove a thyroid or a brain tumor. Much discouragement and pessimism about psychotherapy have resulted because education has not been graded. There can be no such things as "diagnostic psychiatry." No doctor can stand by and simply observe sickness and suffering; to attempt this means to harden the very sensitivity which makes him a physician. Our graduate education must include diverse graduation of experi-

ence and emphasis always upon treatment and ultimate prevention.

Noel Harris,[2] in his admirable book has made the following pertinent remarks:

"The human individual does not like to be puzzled to such an extent that it makes him feel frustrated. If he does feel frustrated, then he may project his own emotional reaction, which results from such puzzlement, on to the sick person. The herd tends to reject those who are an irritation to them. It is well known that certain races kill off or dispose of their senile or weakly members, in fact anyone who may endanger the security of the herd. This fact is closely linked with mythology and tribal customs (Frazer,[3] 1933). For much the same reason the herd rejects the mentally ill person.

"In more recent years this rejection has taken form of segregation and putting mentally ill persons in some place of retention in which they would not harm the herd, the emphasis thus being laid on disposal and retention rather than on cure of the illness. It is small wonder, therefore, that the herd as a whole developed a fear of mental illness, began to feel ashamed at the idea of such illness coming upon themselves or upon their family, and projected that fear on to those people who suffered from mental illness. It is this projection which even today leads people to think it is not "quite nice" to have a mental illness, to attach a stigma to mental illness and mental hospitals and to regard "nerves" as indicating lack of character, a sign of dissolute life, or at any rate a reflection on the person concerned."

Ultimately, in a free country, power is derived from, exercised for, and answerable to the individual citizen. Those to whom leadership is delegated are selected because they are qualified to lead in the direction which ultimately is best for all concerned. Easily stated in theory, this is difficult in practice, particularly when experience has but little to offer. We cannot be satisfied with the results of efforts made thus far, and must pioneer into uncharted territories. Mistakes can easily be made, and ultimate objectives may be lost sight of in the midst of criticisms and feelings then aroused. In this time of great responsibility and opportunity it would be tragic if we could not rise to the level of leadership entrusted to us. We should welcome differences of opinion and ideas other than our own. With the best brains and efforts of all combined we will still be able to see the road ahead only as far as our headlights, and we should not seek to travel faster than safety allows.

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STUDY OF DIAGNOSTIC ERRORS

A review of 2600 case histories discussed at clinicopathological conferences has been given by Hunter. These were presented at the Massachusetts General Hospital and published in the New England Journal of Medicine. Approximately 100 diseases were misdiagnosed and there were 470 errors which the author thought significant. Among the 100 diseases, only 11 were misdiagnosed 10 or more times. Six of these 11 were neoplastic diseases. The occurrence in the order of frequency was:

Carcinoma of the body of the pancreas	22
Carcinoma of the colon	19
Lymphoma	17
Carcinoma of the lung	16
Carcinoma of the stomach	13
Carcinoma of the gallbladder	10

As frequently missed as carcinoma of the body of the pancreas was aortic and mesenteric vessel disease, occurring 22 times. Myocardial and lung infarcts occurred 13 and 10 times. Bacterial endocarditis was found misdiagnosed 17 times, and appendiceal disease 11.

The author remarked on the surprises found in the 22 misdiagnoses of carcinoma of the body of the pancreas. It was correctly diagnosed once in the twenty-five years under review. The predominant symptom of patients with carcinoma of the body of the pancreas was pain in the back. This pain, however, was variable as to relationship to position and followed no consistent pattern from patient to patient. Bizarre radiation of pain was thought to be the result of extension to the diaphragm and to the sciatic nerve. Symptomatology was further complicated by metastases to the mediastinum and pulmonary lymphatics, in 4 of the 22 patients, and by thromboses in 7.

The next surprise was the difficulty of diagnosing bacterial endocarditis in older people. This error occurred in 17 patients. The mistake was in building the diagnosis around the organs subject to embolism. The occurrences of erroneous diagnoses in these instances were nephritis in 6, pneumonia or empyema in 3, brain diseases in 3, nonbacterial aortic valve disease in 3, malignancy in 2, and bacteremia in 1. However, fever over 100° F. was found in 11 of 15 patients, and leukocytosis over 10,000 in 8 of 9 patients. Murmurs were attributed to fever, anemia, or nonactive valvular disease. In many patients, rheumatic heart disease had not been diagnosed. It was noted that the diagnosis of acute glomerulonephritis alone was given to 6 patients, in spite of the rarity of this condition in persons past 50. In 2 patients the diagnosis was not made, al-

though other findings were typical of bacterial endocarditis, because of repeated negative blood cultures, a condition reported to be more common in older than in younger patients with endocarditis.

Consideration of these facts brings the observation that errors in diagnosis may come in as many as 18 per cent, even in patients as thoroughly and thoughtfully studied as these. In 6 of the 11 diseases, the condition was carcinoma or lymphoma, bringing a total of 97 errors due to neoplastic disease. The error of the clinician in this type is not difficult to trace. He is apt to consider the disease of the organ affected to be a degenerative or infectious one in the absence of a specific test for malignancy.

In the 11 diseases misdiagnosed 10 or more times, the first symptoms of many are apt to be reported through the nervous system, in which case, it would be the location and not the origin or the nature of the pathology which is symptomatic. Apparently the further the disease is from the periphery, the greater the difficulty, particularly in the region of the celiac plexus or the mediastinum.

While the recurrence of diagnostic mistakes is understandable, it is still somewhat disquieting to realize that almost 20 per cent of terminal diagnoses may be in error. Further precision may be obtained in part when the clinician has a more comprehensive knowledge of pathology, but in greater part, when he has the means to differentiate the several pathologies which may give the same symptom complex. Even now, some degree of refinement may come if the clinician consciously reviews the possible divergent phases of pathology behind each serious clinical picture.

In the light of Hunter's review, the physician may properly approach diagnosis in a spirit of greater humility and greater diligence.

Hunter, W. S.: A study of diagnostic errors in clinicopathological conferences at the Massachusetts General Hospital during a 25-year period, Permanente Found. M. Bull., 10:306 (August) 1952.

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ORGANIZATION SECTION

The Executive Committee dedicates this section to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

REPORTS FROM WASHINGTON

The House veterans subcommittee has held hearings on non-service care and it looks as though the committee will settle for a tightening up of VA's inability-to-pay regulations. This first came out in questioning of Dr. Walter Martin. Later, the VA testified it could not make changes in the admission form without additional legislation. Meanwhile, Congress has moved at a fast clip with an eye on adjournment around August 1. An announcement is due at any time on the nomination of an Assistant Secretary to Mrs. Hobby and there is a good chance the Special Assistant to the Secretary for Health and Medical Affairs in which we are all interested also will be named in time for Senate confirmation. More appropriations bills have passed and the House has taken action on the Food and Drug's factory inspection bill. Of interest in the light of the stalled Bricker resolution is the following report of a little-publicized hearing of a Senate Foreign Relations subcommittee.

The Senate Foreign Relations Committee has received assurances from State Department officials that in negotiating future bilateral treaties the administration will seek to write in exemptions for the professions, including medicine, from the most-favored-nation clause. A number of professional groups have been concerned over treaties that granted reciprocal rights for practice

without regard to state licensing regulations. The issue came up during hearings on pending treaties of friendship and commerce with Japan, Israel, Denmark, Greece, Ethiopia, and West Germany.

One proposal drawn up by the Senate committee states that reciprocal national treatment would not be extended "to professions which, because they involve the performance of functions in a public capacity or in the interest of public health and safety, are state licensed and reserved by statute or constitution exclusively to citizens of the country, and no most-favored-nation clause in the said treaty shall apply to such professions." State Department officials said they would make every effort to negotiate such a reservation in future treaties and if the Senate desired, it could send the pending treaties back for renegotiation.

CONFEREES AT ODDS ON PHS FUNDS; HOUSE VOTES COMMISSION FUNDS

Senate and House conferees have met for a second time without reaching agreement on the Department of Health, Education, and Welfare budget for the current fiscal year and another meeting has been scheduled. The Senate voted increases above the House totals in three Public Health Service programs, including Hill-Burton hospital construction, over which the conferees were reported deadlocked.

On another front, the House approved and sent to the Senate appropriations for the two commissions which came into being July 10. The Commission on Intergovernmental Relations would receive $500,000 to carry out its studies on the future extent of federal aid in such fields as health, education, and welfare. The Commission on Governmental Operations, which will carry on the reorganization work of the Hoover Commission, would receive $250,000 initially. Still pending are appointments to the commission by the President and Congress.

HOUSE VOTES CUT IN CIVIL DEFENSE MEDICAL STOCKPILING

Despite pleadings of some members, the House has voted to cut the administration's $82 million request for federal stockpiling of civil defense medical supplies to $20 million. The House also supported its Appropriations Committee in approving $3,070,000 for matching funds for state medical supply programs, instead of the requested $5.9 million. Any chance of restoring the funds rests with the Senate which has not yet acted.

The committee noted that through May 30, the Federal Civil Defense Administration had placed orders for $79,350,637 worth of medical supplies but only $41,977,144 had been delivered. It commented: "This merely points out the fact that FCDA has been unable to stockpile medical supplies in keeping with funds appropriated for this purpose by Congress. Progress has been made in this direction but much remains to be done." Additional cuts in operational funds voted by the House may seriously curtail activities of the health and special weapons defense office, FCDA said.

VA REORGANIZATION

Veterans Administration's reorganization plan, first outlined last winter, will go into effect September 7. In announcing this, Acting VA Administrator H. V. Stirling said Vice Admiral Joel T. Boone will continue as chief medical director of the Department of Medicine and Surgery as at present, and assume direction of the Special Services branch. The latter has supervision over chaplains, libraries, canteens, and recreation. Mr. Stirling says the plan will have these advantages: "In Washington there will be fewer officials reporting directly to the administrator; staff and operating responsibilities will be clearly separated at all levels and there will be increased delegations of authority to the field."

AMA STAND ON NON-SERVICE VA CARE OUTLINED TO HOUSE GROUP

American Medical Association's opposition to further treatment in VA hospitals of veterans with non-service-connected disabilities, other than tuberculosis or neuropsychiatric disorders, was formerly placed before Congress July 13. Dr. Walter B.

Martin, president-elect, was opening witness on the fourth day of hearings by the hospitalization subcommittee headed by Rep. B. W. (Pat) Kearney (R., N. Y.). The group is inquiring into hospital entitlement of veterans.

Dr. Martin made it clear that Congress should enact legislation limiting medical and hospital care for veterans in VA and other federal hospitals to (1) men with peacetime or wartime service whose disabilities or diseases are service-connected and (2) within limits of existing facilities, to veterans with wartime service suffering from tuberculosis or neuropsychiatric disorders of non-service origin who are unable to pay for hospitalization. He further proposed that (1) care for the remaining non-service veterans be discontinued and their responsibility revert to the individual or in the case of the indigent veteran, to the community and (2) Congress reanalyze the entire question of whether the non-service chronically ill is a federal or local responsibility.

Acting VA Administrator H. V. Stirling argued, on the other hand, that to exclude veterans with acute non-service disorders who are not eligible for compensation or pension would be "a substantial reversal of long-existing legislative policy." He said it would require the determination that "the government owes no obligation of this kind to these veterans, however indigent."

Points made by other witnesses included:

National Medical Veterans Society (Dr. William B. Walsh): Should eligibility for hospitalization remain as broad as it is now, the burden on the public by 1970 will reach fantastic proportions. *American Dental Association* (Francis J. Garvey): The association opposes VA care for the non-service-connected tooth and "firmly believes that the obligation to care for one's health is primarily the obligation of the individual." *American Psychiatric Association* (Dr. David J. Flicker): Under present VA policy, it is becoming increasingly difficult to staff enough neuropsychiatric beds for non-service-connected veterans.

W. B. MARTIN, M. D.
To the Committe on Ways and Means

HOUSE OF REPRESENTATIVES

The following statement by the president-elect of the AMA might be gratifying or at least give some satisfaction to those members and non-members, who quite frequently ask, what do I get for my $25.00 AMA dues? Mr. Martin's plea for a favorable ruling on this subject, so vital to our members, in itself, may be responsible for saving you the total cost of $25.00, the amount of dues in your national organization. This is only one of the many things AMA does for you.

On June 18, 1953, Dr. Martin testified as follows: "I am appearing today as a representative of the AMA relative to the deduction of college and educational expenses for income tax purposes . . . A total of 134 agencies offer postgraduate medical training, including 43 medical schools, 35 special medical societies, 18 hospitals, 12 academies of general practice, 11 state medical societies, 6 graduate schools of medicine and 3 agencies representing boards of health, schools of public health and government departments respectively . . .

"For a considerable number of years, the House of Delegates and the Board of Trustees of the Association have expressed concern over a ruling by the Commissioner of Internal Revenue holding that expenses incurred by a physician in pursuing postgraduate medical education are personal in nature and therefore, NOT DEDUCTIBLE for federal income tax purposes. It has been extremely difficult to understand the validity of such a ruling because of the fact that physicians have been permitted to deduct the costs of attending medical meetings, of subscriptions to scientific publications and dues paid to medical societies.

"Some time ago the Board of Trustees authorized the employment of a special tax counsel to pursue this matter ON BEHALF OF MEMBERS OF THE ASSOCIATION . . . In an unsuccessful effort to obtain a new ruling from the Bureau of Internal Revenue, it was learned that there was

pending before the United States Tax Court a case in which a lawyer had been denied the right to deduct expenses incurred by him in attending postgraduate courses on taxes . . . The Tax Court held against the taxpayer, and an appeal was made to the United States Court of Appeals. On April 14, the United States Court of Appeals reversed the decision of the United States Tax Court holding, in effect, that expenses incurred by the attorney in taking a postgraduate course WERE DEDUCTIBLE FOR INCOME TAX PURPOSES.

"While it is the belief of the AMA that this decision probably applies to the practicing physician who attends postgraduate courses which are similarly designed to refresh his medical knowledge and to keep him informed regarding recent medical developments, it is by no means clear that the Court's decision covers attendance at postgraduate courses which are designed to advance the physician into a new area of his profession . . .

"In view of these areas of doubt, it is the belief of the American Medical Association that the issue should be settled by new legislation rather than be left to administrative interpretation or judicial decision. We would strongly urge, therefore, that your committee give favorable consideration to an amendment to the existing law authorizing the deduction of postgraduate educational expense for income tax purposes."

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Tuesday of every month	Baton Rouge
Morehouse	Third Thursday of every month	Bastrop
Natchitoches	Second Tuesday of every month	
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

1954 POSTCLINICAL TOUR OF THE NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The seventeenth annual meeting of The New Orleans Graduate Medical Assembly will be held March 8-11, and will be followed by a postclinical tour to Hawaii.

The group will leave Los Angeles via Pan American World Airways on March 14 and accommodations have been secured at the Royal Hawaiian Hotel in Honolulu, Island of Oahu.

After an interesting sightseeing schedule, the group will leave on Wednesday, March 17, for the Island of Kauai, where reservations have been made at the Kauai Inn. Visits will also be made to Hilo and the Kona Coast. The party will return to Honolulu for several days prior to sailing on the S. S. Lurline on Thursday, April 1. Arrangements have been made for visits to hospitals and for various medical programs.

Reservations are limited and are now being accepted. For a complete itinerary, contact the office of The New Orleans Graduate Medical Assembly, Room 103, 1430 Tulane Avenue, New Orleans 12.

MEETINGS

CONGRESS OF NEUROLOGICAL SURGEONS

The third annual meeting of the Congress of Neurological Surgeons will be held at the Roosevelt Hotel in New Orleans on November 12, 13 and 14, 1953. An interesting program has been arranged and members of the medical profession in the vicinity of New Orleans at this time are welcome to attend.

AMERICAN COLLEGE OF CHEST PHYSICIANS

The 20th Annual Meeting of the American College of Chest Physicians will be held in San Francisco, California, June 17-20, 1954. Physicians interested in presenting scientific papers on any phase in the diagnosis and treatment of heart and lung disease should send a 100 word abstract, not later than January 1, 1954, to Doctor Edgar Mayer, Chairman of the Committee on Scientific Program, 850 Fifth Avenue, New York 21, New York.

NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The National Gastroenterological Association will hold its Eighteenth Annual Convention and Scientific Sessions at The Biltmore Hotel in Los Angeles on October 12, 13, 14, 1953.

The program will include a Symposium on Cirrhosis of the Liver; Panel Discussions on "Peptic Ulcer"; "Diseases of the Large Bowel" and "Latest Developments in Cancer Research."

There will be additional papers on interesting subjects in gastroenterology and related fields.

Following the Convention, on October 15, 16, 17, 1953, the Association's Fifth Annual Course in Postgraduate Gastroenterology will be given at The Biltmore Hotel and the College of Medical Evangelists in Los Angeles. The Course will be under the personal direction of Drs. Owen H. Wangensteen of Minneapolis, Minn., and I. Snapper of Chicago, Ill., who will be assisted by a faculty from the medical schols in and around Los Angeles.

The Scientific Sessions on October 12, 13 and 14 are open to all physicians without charge. The Postgraduate Course will only be open to those who have matriculated in advance.

Further information concerning the program and details of the Postgraduate Course may be obtained by writing to the Executive Officer, National Gastroenterological Association, 1819 Broadway, New York 23, N. Y.

FELLOWSHIPS FOR BASIC RESEARCH IN ARTHRITIS

The Arthritis and Rheumatism Foundation is offering the following research fellowships in the basic sciences related to arthritis:

1. Predoctoral fellowships ranging from $1,500 to $3,000 per annum, depending on the family responsibilities of the fellow, tenable for 1 year with prospect of renewal.
2. Postdoctoral fellowships ranging from $3,000 to $6,000 per annum, depending on family responsibilities, tenable for 1 year with prospect of renewal.
3. Senior fellowships for experienced investigation will carry an award of $6,000 to $7,500 per annum and are tenable for 5 years.

The deadline for applications is November 1, 1953. Applications will be reviewed and awards made by February 15, 1954. For information and application forms address the Medical Director, The Arthritis and Rheumatism Foundation, 23 West 45th Street, New York 36, N. Y.

EIGHTH ANNUAL POSTGRADUATE COURSE ON DISEASES OF THE CHEST

The Council on Postgraduate Medical Education of the American College of Chest Physicians, in cooperation with the respective state chapters of the College as well as the staffs and faculties of the local hospitals and medical schools, will sponsor the Eighth Annual Postgraduate Course on Diseases of the Chest at the Hotel Knickerbocker, Chicago, Illniois, September 28-October 2, 1953, and the Sixth Annual Postgraduate Course on Diseases of the Chest to be held at the Hotel New Yorker, New York City, November 2-6, 1953.

These annual postgraduate courses endeavor to bring physicians up to date on recent advancements in the management and treatment of heart and lung disease. Tuition for each course is $75.

Further information may be secured by writing to the Executive Director, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

PROCTOLOGIC RESEARCH FELLOWSHIP GRANT

The International Academy of Proctology announces the establisment and award of a one year Proctologic Research Fellowship in the amount of $1200.00. This Research Fellowship grant has been awarded to the Jersey City Medical Center, New Jersey, to be administered under the direction of Dr. Earl J. Talligan, Surgical Director of the Medical Center.

Dr. Halligan is a former International President of the Academy. The Board of Trustees of the International Academy of Proctology will vote another Fellowship grant of a similar amount at the time of the next Annual Meeting of the Academy. Thus, there will be at least two Research Fellowship studies in progress, in different institutions, under the auspices of the International Academy of Proctology.

1954 COLLEGE ESSAY AWARD

The Board of Regents of the American College of Chest Physicians offers three awards to be given annually for the best original contribution, prepared by any medical student studying for the degree of Doctor of Medicine, on any phase relating to the diagnosis and treatment of chest disease.

The first prize will consist of a cash award of $250 and a certificate. The second and third prizes will be certificates of merit. The Essay Award is open to all medical students in accredited medical schools throughout the world.

The winning contributions will be selected by a board of impartial judges and wil be announced at the 20th Annual Meeting of the American College of Chest Physicians to be held in San Francisco, California, June 17-20, 1954. All manuscripts become the property of the American College of Chest Physicians and will be referred to the Editorial Board of the College journal DISEASES OF THE CHEST for consideration. The College reserves the right to invite the winner of the first prize to present his contribution at the Annual Meeting.

Applicants are advised to study the format of DISEASES OF THE CHEST as to length, form,

and arrangement of illustrations to guide them in the preparation of the manuscript. The following conditions must be observed:

1. Five copies of the manuscript typewritten in English (double spaced) should be submitted to the Executive Director, American College of Chest Physicians, 112 East Chestnut St., Chicago 11, Illinois, not later than March 15, 1954.
2. The only means of identification of the author shall be a motto or other device on the title page and a sealed envelope bearing the same motto on the outside enclosing the name and address of the author.
3. A letter from the Dean or Chairman of the Department of Medicine of the medical school certifying that the author is a medical student studying for the degree of Doctor of Medicine and that the contents represent original work.

WOMAN'S AUXILIARY TO THE LOUISIANA STATE MEDICAL SOCIETY

OUACHITA PARISH

At a recent meeting and "Doctor's Day" celebration the president of the Woman's Auxiliary to the Ouachita Parish Medical Society, Mrs. James W. Schonlau, presented a check for $50 to Mrs. DeWitt Milam, state chairman of the American Medical Education Foundation. The contribution, which was given in memory of deceased doctors of Ouachita Parish, was designated to be divided between Louisiana State University and Tulane Medical schools.

ORLEANS PARISH

Woman's Auxiliary to Orleans Parish Medical Society sponsored a night at "Pops" for the first time in the history of the organization. Miss Dorothy Sarnoff was soloist for the evening. Mrs. Edwin R. Guidry, president, was presented a plaque from the Pops organization by Mr. Irwin Poché.

RAPIDES PARISH

Mrs. John S. Rozier was elected president of Woman's Auxiliary to Rapides Parish Medical Society. Other officers elected were Mrs. M. S. Freiman, president-elect; Mrs. Arthur L. Seale, vice president; Mrs. John Worley, recording secretary; Mrs. R. G. Masterson, corresponding secretary; Mrs. David Trax, treasurer; Mrs. Clarence Pierson, historian; and Mrs. Daniel M. Kinsley, parliamentarian.

LAFAYETTE PARISH

Mrs. J. R. Ferguson was elected president of the Lafayette medical auxiliary. Others officers elected were Mrs. F. M. Harrell, vice-president; Mrs. J. J. Burdin, secretary; Mrs. Thomas Latiolais, treasurer; and Mrs. Mims Mitchell, Jr., historian. At the state convention of the Woman's auxiliary to the Louisiana State Medical Society held recently Mrs. J. Boring Montgomery was elected first vice-president.

WOMAN'S AUXILIARY TO AMA

At the thirtieth annual convention of the Woman's Auxiliary to the American Medical Association which was held in New York, June 1-5, 1953, Mrs. DeWitt Milam of Monroe, Louisiana, was elected fourth vice-president for the year 1953-54. Mrs. Arthur A. Herold of Shreveport, was appointed chairman of the Revisions Committee.

At the convention, recommendation was made and approved to contribute $10,000 of the auxiliary's funds to the American Medical Education Foundation, and $100 to the World Medical Association. Membership of the Woman's Auxiliary was reported to be 63,825.

Mrs. George M. Haik,
State Publicity Chairman.

BOOK REVIEWS

Practical Dermatology, for Medical Students and General Practitioners; by George M. Lewis, M.D. Philadelphia, W. B. Saunders Co., 1952. Pp. 328. Price $7.50.

Designed as a text for medical students and general practitioners, this book is a lucid, usable, elementary guide for the nondermatologist and deals mainly with the diagnosis of the more common skin diseases. The material is arranged with the more important portions in heavy print thereby making information readily available. Photographs, numerous for a book of this size, are excellent. Emphasis on the fungus diseases reflects the author's previous authoritative publications and is notable by comparison with the relatively brief portion on contact dermatitis. Although up to date, treatment in the major part of the text is brief and not detailed. To compensate for this, a dermatologic formulary is included in the final chapter. Medical schools should recommend this text to their students.

JAMES W. BURKS, JR.

PUBLICATIONS RECEIVED

J. B. Lippincott Co., Phila.: New and Nonofficial Remedies, by members and Consultants of the Council on Pharmacy and Chemistry.

W. B. Saunders Co., Phila.: Mechanisms of Urologic Disease, by David M. Davis, M. D.

Charles C Thomas, Springfield, Ill.: Copying and Duplicating Medical Subjects and Radiographs, by H. Lou Gibson, Technical Editor, Eastman Kodak Company.